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**THE ALBERTA JOURNAL OF
EDUCATIONAL RESEARCH**

VOLUME XXIV NUMBER 1 MARCH 1978

**PUBLISHED BY
THE UNIVERSITY OF ALBERTA ● EDMONTON**

THE ALBERTA JOURNAL OF EDUCATIONAL RESEARCH

A quarterly journal devoted to the dissemination, criticism, interpretation and encouragement of all forms of systematic enquiry into education and fields related to or associated with education.

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Published quarterly in March, June, September and December
by the
Faculty of Education
of
The University of Alberta

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AJER gratefully acknowledges support from Canada Council and AACES. AJER is indexed in the *Canadian Education Index*; appropriate articles are abstracted in *Educational Administration Abstracts*, *Psychological Abstracts*, and *Sociology of Education Abstracts*.

The subscription rate is \$8.00 per year; single copies are \$2.50 each. Please make cheques payable to *The Alberta Journal of Educational Research*. All back issues are available in bound and unbound volumes; rates supplied on request. Claims for undelivered copies must be received within three months of the month of publication.

Address all communications to the Editor, *The Alberta Journal of Educational Research*, Faculty of Education, The University of Alberta, Edmonton, Alberta, Canada T6G 2G5.

SECOND CLASS MAIL REGISTRATION NUMBER 1436



The Alberta Journal of Educational Research

Volume XXIV Number 1

March, 1978

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*Announcement
of the*

**Faculty of Education
Lecture Series Award**

The Faculty of Education of the University of Alberta inaugurated in 1977 a Lecture Series Award as one means of encouraging, supporting and publicizing educational research. The recipient of this award will be granted a six-month research leave commencing July 1, 1979. During this time the award holder will be expected to engage in the pursuit of his/her research activities and, as well, prepare a three part lecture series which will be presented in January 1980. At least one of these lectures will deal explicitly with the significance of the research for teaching and/or teacher preparation.

This award is intended to identify and reward those members of the Faculty of Education who have been engaged in educational research to the point where they have:

- (a) gained a reputation among leading scholars as a significant contributor to the advancement of knowledge in their field, through the development and pursuit of a sustained program of research,
- (b) disseminated their findings through the presentation of papers, and/or the publication of articles in refereed journals or books,
- (c) identified a worthwhile research undertaking which can be both significantly advanced and reported as a result of receipt of the award.

ELIGIBILITY:

Only full-time tenured members of the Faculty of Education of the University of Alberta are eligible for the award.

DEADLINE FOR APPLICATION OR NOMINATION:

The Advisory Committee on Selections will commence its work of compiling and reviewing dossiers July 1, 1978. Therefore, nominations of colleagues or of self should be directed to the Chairman of the Committee prior to June 30, 1978. No supporting documentation is required with the nomination.

The research leave will not necessarily be awarded annually.

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Bernard Schwartz
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MERRILL SWAIN

and

HENRI C. BARIK

Ontario Institute for Studies in Education

The Role of Curricular Approach, Rural-Urban Background, and Socioeconomic Status in Second Language Learning: The Cornwall Area Study*

This paper presents the results of the evaluation of a kindergarten level bilingual education program operating in Cornwall (Ontario) and surrounding regions, and of a follow-up 40-minute-a-day French option program (evaluated in Grade 2).

The kindergarten evaluation focussed on three dimensions: (1) curricular approach (alternate half days of English and French instruction vs. alternate full days of English and French instruction), (2) SES level (low SES background vs. middle-upper background), and (3) locale (urban, semi-urban, rural). The Grade 2 evaluation examines the effect of having taken 40 minutes a day of French instruction in Grades 1 and 2 on English language skills and mathematical skills. It also examines performance in French comprehension of the Grade 2 students who had the bilingual kindergarten experience followed by two years of the 40-minute French option relative to the performance of students in other bilingual French programs and in other core French programs. (Dr. Swain and Dr. Barik are with the Modern Language Centre, Department of Curriculum, O.I.S.E.)

A significant educational innovation in Canada in recent years has been the establishment of bilingual education programs for English-speaking students. These programs involve the use of French as the language of instruction for all ("total immersion") or part ("partial immersion") of the curriculum during one or more years of schooling.

To a large extent, the impetus for these programs has come from the recent emphasis on bilingualism in many aspects of Canadian society. One of the pioneering programs was that initiated in 1965 in St. Lambert, on the outskirts of Montreal, which has been carefully monitored over the years (see, e.g., Lambert & Tucker, 1972; Bruck, Lambert & Tucker, 1974). In that program,

English-speaking pupils receive their schooling completely in French throughout Kindergarten and Grade 1. Beginning in Grade 2, English Language Arts are taught for approximately one hour per day. With each successive grade, the proportion of time taught in English is increased so that by the end of elementary schooling approximately half the curriculum is taught in English and half in French. In the wake of the success of that program, a number of similar programs have been started and evaluated in almost every major region in Canada (see, e.g., Barik & Swain, 1976a; Swain & Barik, 1976; Edwards & Casserly, 1976; Gray & Cameron, 1976; Genesee & Chaplin, 1975; Shapson & Kaufman, 1976) and alternative programs have also been initiated to introduce the immersion formula at upper grade levels (e.g., Barik, Swain & Gaudino, 1976; Genesee, Polich & Stanley, 1977). Summaries of research findings and issues relating to immersion programs in Canada are to be found in Swain (1974), Swain and Bruck (1976), and Harley (1976). Immersion programs have also been started in the United States (Cohen, 1974).

To date the vast majority of French immersion or related programs in Canada have been initiated in urban centres and have in general drawn students from the middle to upper-middle class strata of society, although immersion programs have also been started with equal success in urban working class districts (Tucker, Lambert & d'Anglejan, 1973). A program initiated in Cornwall (Ontario) and surrounding areas departs from these other programs in that it involves both urban and rural centres and draws a substantial segment of its population from lower and lower-middle class areas. It also includes two approaches or formulae to bilingual education, the "alternate half days" and "alternate full days" approach, as described subsequently. The present paper discusses the findings of the evaluation of the Cornwall area program in 1975-76. The evaluation was carried out by the Bilingual Education Project of the Ontario Institute for Studies in Education, which is involved with a number of bilingual education programs throughout Ontario.

Background Information and Description of Program

Cornwall is an industrial city of approximately 46,000 inhabitants which is located in eastern Ontario, near the Quebec border. Approximately 60% of its inhabitants are native speakers of English and 40% native speakers of French. Due to the composition of its population and its closeness to the bilingual centres of Ottawa and Montreal, bilingualism in Cornwall is an important issue.

In September 1973 the Stormont, Dundas and Glengarry (SDG) County Board of Education, which has jurisdiction over the English school system in Cornwall and surrounding regions, initiated a bilingual education program at the kindergarten (K) level in eight schools (and 10 classes), with half the curriculum being taught in French and half in English. Two formulae were followed, alternate half days and alternate full days. In the alternate half days approach, instruction is in one language for half the day (A.M. or P.M.) and in the other language for the other half, every school day of the week. The assignment of the two languages to morning or afternoon session varied among schools. In the alternate full days approach, instruction is in one language for the duration of one day and in the other language for the duration

of the following day, with the pattern repeated subsequently. In terms of amount of contact time with the two languages, the two approaches are thus equivalent. The alternate half days (HD) approach was employed in schools within the city limits of Cornwall, while the alternate full days (FD) approach was followed in rural areas and in other schools outside the city limits. (In subsequent years, the FD approach was also adopted by some city schools.)

In terms of amount of contact time with French (half a day per day), both HD and FD programs are thus equivalent to the total immersion half-day K programs followed in several other localities (see, e.g., Barik & Swain, 1975, 1976a; Lambert & Tucker, 1972), and the HD approach is similar to one initiated in Ottawa by the Ottawa Roman Catholic Separate School Board first at the K level (Edwards & Casserly, 1976) and since then extended to further grades (Edwards, Doutriaux & McCarrey, 1976).

Each language component of the program is taught by a different teacher with native or native-like fluency in the language in question. The amount of overlap in content materials is kept to a minimum, but by the nature of early childhood education, some overlap does occur, for example, in teaching mathematics concepts or in routines within the class or special themes (e.g., Christmas). However, each component has its own curriculum with its series of themes.

The bilingual education program of the SDG Board of Education is at present (1975-76) restricted to the K level. In September 1974, the children graduating from either the HD or FD program entered an English Grade 1 program which allowed for 40 minutes per day of instruction in French as a second language. Likewise, in September 1975, they advanced to a similar Grade 2 program. In Grade 1 and Grade 2, there is no strict separation of pupils who followed the bilingual education program in K from those who did not have any French prior to Grade 1.¹ It may be anticipated, therefore, that the French experience acquired by pupils coming from the K bilingual education program will have been somewhat "diluted" by the end of Grade 1 or Grade 2.

At the K level, however, the bilingual education program has continued to exist, and in fact in September 1975, it was extended to the total K population served by the SDG Board of Education within the city limits of Cornwall, as well as to a number of other schools outside the city limits.

At the inception of its K program in 1973, the SDG Board entered into an agreement with the Bilingual Education Project of the Ontario Institute for studies in Education to evaluate the program. The basic concerns at the time were (1) whether pupils in the program (following either HD or FD approach) were as ready by the end of the school year to enter Grade 1 as pupils who were enrolled in the regular K program, which consisted of half-day schooling in English only, and (2) the determination of their level of French proficiency relative to pupils enrolled in other types of programs (e.g., total immersion, or regular program with daily instruction in French).

Due to a number of factors, an extensive evaluation of the program could not be carried out in the first two years of the program. The partial analysis carried out in 1973-74 revealed that there was no overall reliable difference between pupils in the bilingual education program and equivalent groups of pupils attending a regular K program relative to their readiness for beginning school work in Grade 1. In terms of level of proficiency in French listening

comprehension when placed in relation to pupils in other localities, pupils in the SDG bilingual education program scored approximately the same as pupils in a similar (half French, half English) program in Grade 1 who had had no French in K and had therefore had the same amount of contact time with French as the SDG group, as well as pupils in a regular Grade 1 program who had had 20-40 minutes of French per day throughout K and Grade 1 and had thus had less contact time with French on a cumulative basis than the SDG group (27.1 out of 62 for the SDG pupils, 28.2 for the Grade 1 bilingual program pupils, 29.4 for the Grade 1 regular program pupils), but the SDG pupils scored substantially lower than pupils in a K total French immersion (half-day) program (36.5 out of 62; non-SDG scores reported in Barik & Swain, 1976b).

Similar results were obtained on the basis of an evaluation in spring of 1975, in which the same test of French listening comprehension was administered to samples of pupils in K and Grade 1. The Grade 1 pupils were from among those who had attended the K bilingual education program the previous year (Cohort I) and who were receiving 40 minutes of French per day in Grade 1, while the K pupils represented the second stream of children entering the bilingual program (Cohort II). The latter obtained a score of 29.5, similar to that of the preceding K group, while the Grade 1 pupils scored somewhat higher (34.2).²

1975-76 Evaluation

Sample. In Spring 1976, it was decided to evaluate the new K group (Cohort III) and also look at the initial cohort (Cohort I), which was then in Grade 2. Since, as mentioned, the bilingual education program was in operation throughout most of the K classes served by the SDG Board, the focus of attention in K shifted from a consideration of the bilingual education program relative to the regular program to one of considering three dimensions within the bilingual education program: curricular approach, locale, and socioeconomic level.

1. *Curricular approach.* Alternate half days (HD) vs. alternate full days (FD). A group of K pupils following the HD approach was compared with a group of K pupils following the FD approach. Both groups were from urban area schools (Cornwall) of similar socioeconomic level (low SES). The HD group involved one class (16 pupils) and the FD group, two classes within a school (34 pupils).

2. *Locale.* This study differs from that of many other innovative programs of French as a second language in Canada (such as total immersion), where students come primarily from middle and upper-middle class families located in urban centres, in that it extends the research to semi-urban and rural areas. In this context, it relates partly to a study carried out in Great Britain by Burstall, Jamieson, Cohen and Hargreaves (1974) which considered the school achievement of pupils who were undertaking studies in French as a foreign language in urban as well as rural centres. Burstall et al. found that rural area children performed as well and sometimes better in academic or specific subject areas. (Their pupils were older than the SDG group, being 8 or 11 years old at the start of the investigation.)

In the present study, three locales were defined: (a) urban (within the city limits of Cornwall), (b) semi-urban (small size town outside city limits), and (c)

rural (pupils coming from a predominantly agricultural environment). To consider this dimension, classes were selected from each area specified (two classes within the same school for the urban group, one class in the case of each of the other groups), with curricular dimension held constant (FD in all instances) and socioeconomic level varying between low-middle and middle class. (It was not possible to hold this factor constant across the three areas.) The numbers of pupils involved, once a few pupils who did not belong to the category specified were excluded from the analysis (12 pupils altogether), were: urban, 26; semi-urban, 14; rural, 16. The semi-urban and rural groups went to the same school, the semi-urban group consisting of pupils who lived in the town and were not bused to school, and the rural group of pupils from the surrounding region who were bused to school. (The two groups constituted separate classes within the school.)

3. *Socioeconomic level (SES)*. As stated previously, most innovative French programs have been developed in the context of middle to upper-middle SES environments. The question has been asked whether they may be equally effective in lower SES settings where there may not be the same level of parental support for or involvement in the program. With respect to total French immersion, that issue has been considered by Tucker, Lambert, and d'Anglejan (1973) and Bruck, Jakimik, and Tucker (1971), who found that relative to peers in the regular English program from the same SES milieu, immersion pupils in a low SES environment benefited as much from the immersion program as did pupils from more favoured backgrounds. These two studies, however, did not directly compare different SES groups of French immersion pupils, as is the case in the present study. It should be noted that in the Grade 1 bilingual education program evaluated by Edwards, Doutriaux, and McCarrey (1976), comparisons were also made between pupils from low SES and middle-upper SES backgrounds, and some significant differences were observed between the two; however, the overall picture led the investigators to conclude that there was no evidence of detrimental effects of the bilingual program for low SES pupils.

Further research on SES level as it relates to French immersion has also been carried out by Cziko (1975) and is discussed by Genesee (1976).

In the present study two levels were specified: *low SES* and *middle to middle-upper (MU) SES*.³ One school was selected to represent each level, with both curricular approach (HD) and regional area (urban) held constant. One class (16 pupils) was involved in the low SES school, and two classes (27 pupils) in the MU-SES school. (The low SES class in this design was the same as the HD class in the consideration of curricular approach.)

The SES levels of the schools were specified by the SDG Board authorities. To determine the accuracy of these labels, information was obtained on the father's (as well as mother's) occupation for all pupils in the sample. This material generally confirmed the validity of the SES assignments, even if within each class a few pupils came from a home SES background unrepresentative of the class as a whole. To quantify the SES concept, the occupation of the head of the household (father or, in some instances, mother) in the case of each child was assigned a value on the basis of the classification scheme of occupations developed in a Canadian context by Blishen (1958). Occupations on this scale are grouped into seven classes from a "high" of 1 (e.g., doctors, judges, architects) to a "low" of 7 (e.g., janitors,

labourers, cooks), based on years of schooling and income. The average rating of the low SES group was 5.5 while that of the MU-SES group was 2.8, thus indicating a clear distinction between the two groups on the SES dimension. (The FD low SES group involved in the curricular approach comparison, item 1 above, had an SES rating of 4.6.)⁴

Kindergarten

Test Battery

The following tests were administered in spring of 1976:

1. *Otis-Lennon Mental Ability Test* (Primary 1 Level, Form J). This general intelligence test measures the pupil's facility in reasoning and in dealing abstractly with verbal, symbolic, and figural materials covering a broad range of cognitive abilities. Taking age into consideration, raw scores are converted into standardized Deviation IQ (DIQ) scores, which provide an index of mental ability.

2. *Metropolitan Readiness Tests* (Form A). The Metropolitan Readiness Test has six different sections designed to measure the child's readiness for school work in Grade 1: (i) word meaning, a picture vocabulary test; (ii) listening, a test of phrase and sentence comprehension; (iii) matching, a test of visual perception involving the recognition of similarities; (iv) alphabet, a test of ability to recognize lower-case letters of the alphabet; (v) numbers, a test of number knowledge; and (vi) copying, a test of visual perception and motor control.

3. *French Comprehension Test* (Primer). This is a test developed by the Bilingual Education Project to measure the child's comprehension of French, and is intended primarily for use in total French immersion K programs (which compare with the SDG program in terms of amount of contact time with French). The test consists of three parts. The first, words and sentences, requires the child to identify the picture referred to by a spoken French word or sentence. The second, questions, measures the child's ability to choose the correct pictorial answer to a question in French. The third, stories, requires the child to choose the correct pictures in answer to questions concerning short stories which have been read aloud in French.

The testing was carried out by consultants of the SDG County Board of Education.

Design of Analysis

In the comparisons that follow, differences between the groups considered were analyzed through one-way analysis of variance as well as through analysis of covariance using age and IQ as covariates. The data of three pupils who either had only covariate scores or who lacked such scores were excluded from the analysis.

Results

A. *Curricular Approach*. The data for the analysis relating to curricular approach (HD vs. FD) is shown in Table 1.

1. *Age and IQ*. As seen, there are no reliable differences between the two groups relative to age or (Deviation) IQ. On the latter measure, the HD group,

TABLE 1
KINDERGARTEN, CURRICULAR APPROACH: HALF DAYS (HD) vs.
FULL DAY (FD) PROGRAM; UNADJUSTED AND ADJUSTED MEANS

	Unadjusted Means				Adjusted Means (covariates=Age + DIQ)			
	HD Group (N=15)	FD Group (N=34)	F ratio	df	HD Group	FD Group	F ratio	df
Age (months, end year)	70.27	70.24	0.00	1/47				
Otis-Lennon Mental Ability Test--DIQ	110.67	114.50	0.77	1/47				
Metro. Readiness Test Total (102 items)	65.87	62.32	0.72	1/47	68.12	61.33	9.08**	1/45
a. Word meaning (16)	8.33	8.12	0.08	1/47	8.61	8.00	0.90	1/45
b. Listening (16)	10.13	10.36	0.10	1/47	10.34	10.26	0.02	1/45
c. Matching (14)	10.53	9.03	2.75	1/47	10.91	8.86	8.33**	1/45
d. Alphabet (16)	11.73	12.32	0.26	1/47	12.22	12.11	0.02	1/45
e. Numbers (26)	14.80	15.85	0.67	1/47	15.42	15.58	0.03	1/45
f. Copying (14)	10.33	6.65	22.08***	1/47	10.61	6.53	37.81***	1/45
French Comprehension Test Primer, Total (max. 45)	26.00	28.34	1.29	1/45	26.92	27.91	0.32	1/43
a. Part 1-Words/ Sentences (25)	15.00	16.91	2.00	1/45	15.66	16.60	0.72	1/43
b. Part 2-Questions (10)	6.60	7.22	1.89	1/45	6.72	7.16	1.02	1/43
c. Part 3-Stories (10)	4.40	4.22	0.09	1/45	4.54	4.15	0.47	1/43

** $p < .01$
*** $p < .001$

with an average IQ score of 110.7, scores in the vicinity of the 75th percentile relative to (American) norms for the test and the FD group, with a score of 114.5, scores slightly above the 80th percentile.

2. *School Readiness.* When unadjusted scores are considered, no difference is noted between the two groups on overall (total) measure of school readiness as measured by the *Metropolitan Readiness Tests* (MRT), and when the various sections of the test are investigated, the only reliable difference that emerges is with respect to the section on copying, on which the HD group scores significantly higher than the FD group ($p < .001$). There is no immediate explanation for this finding. (It is interesting to note that a similar trend ($p = .10$) is noted with respect to matching, which likewise involves perceptual processes.) It seems unlikely that this finding can be attributed to the effect of the dimension of the curricular approach that has been examined (HD vs. FD).

When scores are adjusted for age and IQ, however (even though the two groups do not differ significantly on these two factors), the difference between the two groups on overall readiness score, in favour of the HD group, becomes statistically significant ($p < .01$). As seen from the subtest results, this is a function of the two sections specified previously, matching ($p < .01$) and copying ($p < .001$). However, until further evidence such as that derived from replication studies and observational data is found to link the results on these two sections to the curricular dimension investigated here, caution must be employed in interpreting the significant overall difference in school readiness between HD and FD groups.

In terms of (American) norms for the test (on the basis of unadjusted scores), HD pupils score at the 73rd percentile and FD pupils at the 66th percentile.

3. *French Comprehension.* Table 1 reveals that there is no reliable

difference between HD and FD pupils in level of French comprehension; thus the two curricular approaches, which involve the same amount of contact time with French, yield equivalent results in measure of French listening comprehension.

There are as yet no norms for the *French Comprehension Test, Primer*, on the basis of which to evaluate the scores of 26.0 and 28.3 out of 45 obtained by the HD and FD groups, respectively. It may be worth noting, however, that these scores are in close agreement with an “approximative” score of 25.4 determined for the test on the basis of prior data from children in a French immersion K who had an equivalent amount of contact time with French as the SDG pupils, and “actual” scores of 24.3 recorded in French immersion K programs in two other localities in Ontario and of 25.6 for pupils following a program similar to the SDG one in several schools in the province of Quebec.⁵ These results thus suggest that pupils in the SDG bilingual education program (following either HD or FD approach) attain the same level of proficiency in French as pupils in a French immersion K who are exposed to the same amount of contact time with French.⁶

(If the French Comprehension Test data from Tables 1, 2, and 3 are combined, counting the HD data in Table 1, which is repeated as the low SES data in Table 3, only once, the average score for all Cornwall/SDG pupils considered is 27.30.⁷ Thus, overall, the SDG pupils tested score as well as total immersion pupils for whom data are presently available.)

In summary, there appear, therefore, to be few differences in the results obtained on the basis of either HD or FD curricular approach.

B. *Locale*. The data for the analysis by locale (urban, semi-urban, rural) are shown in Table 2.

1. *Age and IQ*. No reliable difference is found among the three groups with respect to age. On IQ, however, there is a reliable difference among the three

TABLE 2
KINDERGARTEN, GEOGRAPHICAL REGION: URBAN (U), SEMI-URBAN (SU),
RURAL (R); UNADJUSTED AND ADJUSTED MEANS

	Unadjusted Means					Adjusted Means (covariates=Age + DIQ)				
	U (N=25)	SU (N=14)	R (N=15)	F ratio	df	U	SU	R	F ratio	df
Age (months, end year)	70.12	69.29	69.87	0.31	2/51					
1. Otis-Lennon Mental Ability Test--DIQ	118.96	110.21	109.53	3.68*	2/51					
2. Metro. Readiness Test Total (102 items)	66.52	63.86	60.87	0.97	2/51	62.61	67.21	64.25	1.42	2/49
a. Word meaning (16)	10.08	9.29	9.27	0.96	2/51	9.58	9.72	9.70	0.03	2/49
b. Listening (16)	11.08	9.57	9.73	3.46*	2/51	10.65	9.96	10.09	0.83	2/49
c. Matching (14)	9.40	9.43	9.60	0.02	2/51	8.71	10.03	10.19	2.15	2/49
d. Alphabet (16)	14.16	12.71	12.13	1.93	2/51	13.51	13.27	12.70	0.32	2/49
e. Numbers (26)	13.32	13.50	13.07	0.07	2/51	12.41	14.23	13.89	2.90	2/49
f. Copying (14)	8.48	9.36	7.07	1.81	2/51	7.75	10.00	7.68	3.35*	2.49
3. French Comprehension Test, Primer (45)	22.48	19.85	22.64	1.61	2/47	21.33	20.83	23.61	2.19	2/45
a. Pt.1-Wds/Sent. (25)	13.09	13.15	14.64	1.42	2/47	12.54	13.62	15.11	3.83*	2/45
b. Pt.2-Questions (10)	5.57	3.92	5.21	3.12*	2/47	5.15	4.28	5.57	2.14	2/45
c. Pt.3-Stories (10)	3.83	2.77	2.79	3.34*	2/47	3.64	2.93	2.94	1.42	2/45

* $p \leq .05$

groups ($p < .05$). A further analysis indicates that the urban group from Cornwall (IQ = 119.0) differs from both other groups ($p < .05$), while there is no difference between semi-urban (110.2) and rural (109.5) groups.

In terms of norms for the mental ability test, the urban pupils score at the 88th percentile and the semi-urban and rural pupils at the 73rd percentile.

2. *School Readiness.* Table 2 indicates that there are no reliable differences among the three groups on the total score of the MRT on the basis of either unadjusted or adjusted scores. Thus even though urban area pupils have higher IQ's, pupils from the other two regions — rural and semi-urban — are still as ready for beginning school work in Grade 1.

In their study involving urban and rural comparisons, Burstall et al. (1974) attributed their findings showing equivalent or better academic performance on the part of rural area pupils relative to urban area pupils, to differences in the school environments of the two groups. The typical environment for rural area pupils was that of the small one-room school, with close contacts and close teacher involvement, whereas urban area pupils frequented larger more impersonal establishments. In the present study, however, these differences are not as apparent; the semi-urban and rural area schools are not of the one-room type and resemble in many respects the urban area schools. The study thus generalizes Burstall et al.'s (1974) findings relative to the urban-rural dimension to more uniform environments than those characterized by their study.

On the MRT as a whole, urban pupils score at the 74th percentile, semi-urban pupils at the 69th percentile, and rural pupils at the 63rd percentile.

When subtests are considered, there is a reliable difference among the three groups ($p < .05$) in listening on the basis of unadjusted scores, with the urban group scoring higher ($p \leq .05$) than each of the other two groups. When scores are adjusted for age and IQ, the difference in listening disappears, but one emerges on the copying section ($p < .05$), with the urban group scoring higher than the other two groups.

3. *French Comprehension.* As can be seen from Table 2, there is no reliable difference among the three groups in level of French comprehension on the basis of either unadjusted or adjusted total scores, although there are some differences on some of the subsections. The unadjusted scores of 22.5, 19.9 and 22.6 for the urban, semi-urban and rural groups, respectively, are somewhat lower than those recorded for other urban groups in the overall evaluation (see Tables 1 and 3), and also somewhat lower than those specified earlier for pupils in other localities ("approximative" as well as "actual" scores).

Generally, therefore, the data suggest that the bilingual education program offered by the SDG Board is equally as applicable in semi-urban and rural areas as in urban areas.

C. *Socioeconomic Level.* The data for the analysis by socioeconomic level or status (SES) — low SES vs. MU-SES — is shown in Table 3. As stated previously, the class which represents the low SES group is the same as that which represented the HD curricular dimension in Table 1, hence the identity of the (unadjusted) data for that group in Tables 1 and 3.

1. *Age and IQ.* There is no reliable difference between the two groups in age, but there is one with respect to IQ, favouring the MU-SES group

TABLE 3
KINDERGARTEN, SOCIOECONOMIC LEVEL: LOW SES vs. MIDDLE TO
MIDDLE-UPPER (MU) SES; UNADJUSTED AND ADJUSTED MEANS

	Unadjusted Means				Adjusted means (covariates = Age + DIQ)			
	Low SES (N=15)	MU-SES (N=27)	F ratio	df	Low SES	MU-SES	F ratio	df
Age (months, end year)	70.27	69.19	1.04	1/40				
1. Otis-Lennon Mental Ability Test--DIQ	110.67	120.70	4.95*	1/40				
2. Metro. Readiness Test Total (102 items)	65.87	73.33	5.00*	1/40	69.17	71.50	0.87	1/38
a. Word meaning (16)	8.33	10.70	9.99**	1/40	8.68	10.51	6.27*	1/38
b. Listening (16)	10.13	11.70	6.12*	1/40	10.48	11.51	2.70	1/38
c. Matching (14)	10.53	10.48	0.00	1/40	11.07	10.18	1.60	1/38
d. Alphabet (16)	11.73	14.85	13.48***	1/40	12.22	14.59	7.83**	1/38
e. Numbers (26)	14.80	16.26	1.35	1/40	15.85	15.67	0.03	1/38
f. Copying (14)	10.33	9.33	1.94	1/40	10.86	9.04	7.46**	1/38
3. French Comprehension Test, Total (45)	26.00	37.27	41.29***	1/39	27.33	36.50	36.75***	1/37
a. Pt.1-Wds/Sent.(25)	15.00	20.77	24.57***	1/39	15.91	20.24	19.60***	1/37
b. Pt.2-Questions(10)	6.00	8.46	20.07***	1/39	6.71	8.40	14.63***	1/37
c. Pt.3-Stories(10)	4.40	8.04	41.42***	1/39	4.71	7.86	32.31***	1/37

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

($p < .05$). In terms of norms, the low SES group scores at the 74th percentile and the MU-SES group at the 90th percentile.

2. *School Readiness.* On the basis of unadjusted scores, the MU-SES group scores significantly higher than the low SES group on the total MRT test ($p < .05$) as well as on three subtests (word meaning, listening and alphabet). However, when scores are adjusted for age and IQ, the overall test difference disappears, while the subtests that reveal significant differences are word meaning, alphabet and copying (in favour of the low SES group in the latter instance).

In terms of norms for the test (unadjusted scores), low SES pupils score at the 73rd precentile and MU-SES pupils at the 86th percentile.

3. *French Comprehension.* The MU-SES group scores significantly higher ($p < .001$) than the low SES group on the French Comprehension Test, on the basis of unadjusted as well as adjusted scores. This applies also to all subsections of the test. The score of the low SES group (26.0 out of 45), however, appears adequate and, as previously stated, in line with data from total immersion programs, so that the significant differences between the two groups is attributable primarily to the high level of performance of the MU-SES group (37.3), which is atypical relative to other scores obtained in the study (Tables 1-2). Their level of performance may thus be representative of a school/teacher effect.

Grade 2

As stated earlier, in Grade 2 the French option consists of daily 40-minute periods. Pupils of Cohort I who were enrolled in the bilingual program in K (in 1973-74) do not constitute separate classes but are to be found with pupils who began the French-as-a-second-language program (40 minutes/day) in Grade 1 or 2.

Sample

In the 1975-76 evaluation, only a few Grade 2 classes were tested. The experimental group consisted of pupils who had attended the K bilingual program and had taken French (40 minutes/day) in Grades 1 and 2. The comparison group consisted of pupils from other comparable classes who had not taken any French throughout K-2. The experimental classes selected were those which retained a large proportion of pupils who had followed the K bilingual program. The two groups were represented in both urban and rural areas, with pupils from low and middle SES backgrounds. The experimental group consisted of 4 classes involving 76 pupils and the comparison group of 3 classes and 73 pupils.

In the analysis, a number of pupils were excluded, as follows: (a) pupils who did not satisfy the group definition of either French or no French instruction throughout Grades K-2; (b) pupils whose age fell outside a specified age range (74-110 months), which is ± 18 months from the "normal" age of 92 months for Grade 2 pupils in May (assuming that they begin in Grade 2 at 7 years or 84 months). This criterion was used to exclude atypical cases; (c) pupils unable to understand or express themselves in English, as indicated by a linguistic code assigned by the teacher; (d) pupils for whom no IQ data (employed as a covariate) was available.

In the case of each group, 14 pupils were excluded on the basis of the above criteria; thus the analysis was based on 62 experimental and 59 comparison pupils.⁸

Test Battery

The following three tests were administered to Grade 2 pupils:

1. *Canadian Cognitive Abilities Test* (Primary 2). This test of mental ability does not require any reading and consists of four parts: (i) oral vocabulary, which measures the child's ability to label or name objects or actions or to identify objects when given their use; (ii) relational concepts, which measures the ability to identify size, position and quantity; (iii) multimental ("one that doesn't belong"), which measures the ability to see relationships and to categorize or classify objects; (iv) quantitative concepts, which measures the ability to deal with quantitative relationships and concepts. The raw score on the test is converted to a (deviation) IQ measure.

2. *Canadian Tests of Basic Skills* (Primary Battery, Level 8). This is a battery of tests which provides for comprehensive measurement of growth in several areas. There are five sections to the test: (i) vocabulary, which measures the reading and knowing of words (on the basis of pictorial or incomplete sentence stimuli); (ii) word analysis, which involves sound-letter association, phonetic analysis and word structure; (iii) reading, which involves sentences and stories; (iv) spelling, where the child has to select the misspelled word from three choices; and (v) mathematics, which contains two parts, one based on *concepts* and the other on *problem solving*. In the scoring, the two mathematics sections are also combined to yield a total mathematics score, and all five sections of the test (vocabulary, word analysis, reading, spelling, and total mathematics) are in turn combined to yield a total test composite score.

3. *French Comprehension Test* (Level 1). This is a test of French listening

TABLE 4
GRADE 2, UNADJUSTED AND ADJUSTED MEANS

	Unadjusted Means				Adjusted Means (covariates = Age + IQ)			
	Exp. Gr. (N=62)	Comp. Gr. (N=59)	F ratio	df	Exp. Gr.	Comp. Gr.	F ratio	df
Age (months, end year)	95.91	96.29	0.28	1/122				
Canadian Cognitive Abilities Test--DIQ	104.18	100.34	1.77	1/222				
Canadian Test Basic Skills Grade Equiv. Sc.								
1. Vocabulary	2.78	2.79	0.01	1/120	2.73	2.85	0.91	1/118
2. Word analysis	2.84	2.79	0.09	1/122	2.79	2.85	0.20	1/120
3. Reading	2.76	2.93	1.11	1/119	2.70	3.00	5.28*	1/117
4. Spelling	2.49	2.84	4.56*	1/119	2.44	2.89	8.34**	1/117
5. Math concepts	2.58	2.77	1.88	1/121	2.53	2.83	10.21**	1/119
6. Math problems	2.60	2.87	4.57*	1/120	2.55	2.92	14.78***	1/118
7. Math Total	2.60	2.86	4.38*	1/119	2.55	2.91	18.59***	1/117
8. CTBS Composite	2.67	2.86	1.89	1/116	2.60	2.92	8.17**	1/114
French Comprehension Test, Level 1, Total (max.=45)	12.31	---						
Pt.1-Wds/Sent. (22)	4.97	---						
Pt.2-Questions (9)	2.38	---						
Pt.3-Stories (14)	4.95	---						

* $p < .05$
** $p < .01$
*** $p < .001$

comprehension similar in format to the one employed in K. The Level 1 test is intended primarily for pupils completing Grade 1 of a total French immersion program.

Results

The Grade 2 results are found in Table 4.

1. *Age and IQ.* As seen from Table 4, there is no reliable difference between experimental and comparison groups with respect to either age or IQ. In terms of norms for the *Canadian Cognitive Abilities Test*, the experimental pupils score at the 60th percentile and the comparison pupils at about the 50th.⁹

2. *English and Mathematics Skills.* Table 4 presents the results on the *Canadian Tests of Basic Skills* in terms of grade equivalents. Since pupils were tested in May, their grade placement at the time of testing was 2.8. As can be seen from the data (unadjusted scores), the comparison group scores at approximately that level on all sections of the test (English and mathematics sections as well as composite or total test score), while the experimental group obtains slightly lower grade equivalent scores on a few sections of the test. Statistically, the comparison group scores significantly higher ($p < .05$) than the experimental group on spelling, mathematics problems and mathematics total on the basis of unadjusted scores. When scores are adjusted for age and IQ, these differences are maintained (at $p < .01$ or $p < .001$), and in addition the comparison group scores significantly higher on reading ($p < .05$), mathematics concepts ($p < .01$) and composite test score ($p < .01$).

It would thus appear that the experimental group is generally somewhat behind the comparison group in English and mathematics skills by the end of Grade 2. It may be conjectured that this is attributable to the time devoted to French (40 minutes/day) in the experimental group's program in Grades 1

and 2, which reduces by the same amount the time devoted to instruction in English. Whether the bilingual education experience of the experimental pupils in K is also a contributing factor is difficult to determine; in terms of amount of schooling in English in K, the experimental pupils had the same amount (the equivalent of half a day per day) as the comparison pupils, and as stated previously, obtained similar results with respect to school readiness (on the basis of more extensive samples of pupils), so that the effect of the K experience on the differential Grade 2 results is unlikely. Aside from the time factor as a possible explanation for the Grade 2 results, it may be that there are other aspects to the situation: the introduction of the French component for short daily periods may lead to temporary disturbances in the classroom which have some effect on the teaching of other program material or on the motivational/attitudinal climate of the classroom. The situation needs to be monitored more carefully.

It is interesting to note that the present study is one of the few that make comparisons between a French-as-a-second-language program (40 minutes/-day) and no-French as this factor relates to performance in other subject areas (English, mathematics). The majority of studies have typically considered a "massive" French program (e.g., total or partial immersion) in relation to either a French-as-a-second-language program (e.g., Swain & Barik, 1976) or no-French (e.g., Barik & Swain, 1976a), but the issue of the relationship between a regular French-as-a-second-language program (40 minutes/day) and a no-French program has seldom been considered.

3. *French Comprehension.* On the *French Comprehension Test, Level 1*, the experimental pupils obtain a score of 12.3 out of 45. There are no other data with which this score can be compared directly, as there is no other group following exactly the same program. However, on the basis of data found in Barik, 1976b (p. 16), several indirect comparisons are possible. One is with a Grade 2 bilingual program where, following English K, pupils receive half of their instruction in English and half in French throughout Grades 1 and 2. These pupils obtain a score of 12.5 on the test. Another comparison is with a Grade 1 intensive French program which involves a half-day English, half-day French program in K (thus similar to the Cornwall situation), followed by 90 minutes of French per day in Grade 1, which thus yields approximately the same amount of contact time with French as that encountered by SDG pupils in the course of Grades 1 and 2 (a cumulative amount of 80 minutes per day). Pupils in the intensive French Grade 1 program obtain a score of 13.0. A third comparison is with pupils in a Grade 2 core French program who receive 30 minutes of French per day in K (in contrast to the SDG pupils) and 40 minutes per day in Grades 1 and 2 (similar to the SDG group). Pupils in the core French program obtain a score of 10.6, which is somewhat lower than that of the Cornwall Grade 2 group. The score of the SDG pupils would thus appear to be adequate when placed in relation to these other groups.

Conclusions

The findings reviewed above with respect to the K bilingual program and the Grade 2 program in schools under the jurisdiction of the SDG County Board of Education are summarized below.

In the *Kindergarten program*:

1. With respect to the *curricular approach*: (a) There are no reliable differences between pupils following the HD approach and those following the FD approach with respect to age or IQ; (b) With respect to school readiness, there is no overall difference between the two groups on the basis of unadjusted scores, but there is an overall difference favouring the HD group when scores are adjusted for age and IQ. This difference seems to be a function of two subtests, matching and copying, which involve perceptual and motor processes; (c) HD and FD pupils exhibit similar levels of French comprehension, which are commensurate with those obtained by pupils in total French immersion K programs who have the same amount of exposure to French.

2. With respect to *locale*: (a) There is no reliable difference among urban, semi-urban, and rural area pupils with respect to age, but there is one with respect to IQ, with urban pupils scoring higher than the other two groups; (b) No reliable difference is found among the three groups in overall measure of school readiness on the basis of unadjusted as well as adjusted scores. A difference favouring the urban group is found on the listening section on the basis of unadjusted scores, while one favouring the semi-urban group is found on the copying section when scores are adjusted for age and IQ. In general, then, pupils from all three areas appear to be equally ready for beginning school work in Grade 1; (c) There is no reliable difference in overall level of French comprehension among the three groups.

3. With respect to *socio-economic status* (SES): (a) There is no reliable difference between low SES and MU-SES pupils attending the bilingual program with respect to age, but there is one favouring the higher SES group with respect to IQ; (b) MU-SES pupils score higher in school readiness than low SES pupils when unadjusted scores are considered, but the overall difference disappears when adjustment is made for IQ (and age) differences; however, reliable differences in favour of the MU-SES group remain with respect to word meaning and alphabet, while the low SES group scores significantly higher on copying; (c) MU-SES pupils score significantly higher than low SES pupils on a measure of French listening comprehension, but this is due to their atypically high level of performance relative to other groups tested, indicative possibly of a school/teacher effect. The performance level of the low SES group appears adequate in relation to other comparative data.

In the *Grade 2 program*, (a) There is no reliable difference between the experimental pupils following the French option (40 minutes per day in Grades 1 and 2, following bilingual K) and the comparison pupils not taking French, with respect to either age or IQ; (b) Pupils in the experimental group score significantly lower than pupils in the comparison group with respect to most aspects of English and mathematics skills when scores are adjusted for age and IQ. This may be a function of the reduction in the amount of instruction in English which they receive; (c) On a measure of French comprehension, the experimental pupils score similarly to pupils in other programs with whom some indirect comparisons can be made.

The results from this study thus suggest that a French immersion K can be effectively undertaken in rural as well as urban areas, and with low as well as

middle-upper SES groups. Considering the results related to English achievement at the Grade 2 level, however, leads one to question the efficacy of following the immersion experience with a 40-minute a day French option. In other programs which have continued the immersion experience through later grades, French language performance is considerably better and, additionally, no long-run detrimental effects on English language skills have been noted.

*Thanks are expressed to the administrators of the Stormont, Dundas Glengarry County Board of Education, to the principals and staff of the schools participating in the study, for their cooperation. Special thanks are addressed to Denis Boissonneault and Donalda Smith. We also wish to express our gratitude to Edna A. Nwanunobi for her assistance in the analysis of the data, and to Sharon Lapkin, who acted as liaison with the Board authorities.

The research reported in this paper was funded by a Grant-in-Aid of Educational Research from the Ministry of Education for the Province of Ontario.

Notes

- ¹ Although the Board envisaged separate programs in Grade 1 and subsequent grades for pupils graduating from the K bilingual education program, this has apparently not been administratively feasible.
- ² The Cornwall results discussed here (1973-74 and 1974-75) are based on unpublished data.
- ³ The Cornwall area generally lacks a high SES population, so that it was not possible to have a more marked distinction, such as between low SES and high SES.
- ⁴ Although in the present Canadian context some occupations no longer quite correspond to their assignment in the Blishen (1958) classification scheme, e.g., certain types of engineering professions may no longer rate 1 in terms of socio-economic dimension, the scale remains a useful instrument.
- ⁵ The "approximative" score was obtained on the basis of an earlier version of the test by considering only the items that appear in the published version (Barik, 1976a). The "actual" scores cited were provided by school boards which made use of the test in evaluations of their French programs. The data from these school boards and from others will be used to derive norms for the test.
- ⁶ The present results thus contrast with those recorded in 1974, which showed the SDG pupils scoring lower in French comprehension than total immersion pupils, on the basis of a different version of the test.
- ⁷ This figure is based on 123 pupils rather than on the N of 130 indicated by the group N's at the start of each table, since 7 pupils lacked a score on the test.
- ⁸ Criteria similar to (b) and (c) above were also in effect for the K data, but did not lead to the exclusion of any pupils. In addition, in the analysis of French comprehension test data, the scores of pupils coming from a home environment where French was used as a means of communication were eliminated (on the basis of score criteria). This affected one pupil in Grade 2, but none in K.
- ⁹ The substantial differences in the percentile ranks associated with the Grade 2 data relative to those for K discussed in relation to Tables 1-3 likely reflect the fact that the norms were developed with different populations — American norms for the Otis-Lennon test in K and Canadian norms for the Canadian Cognitive Abilities Test in Grade 2.

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Effect of Practice on Form Discrimination Learning: A Test of the Distinctive Features and Schemata Hypotheses

Thirty subjects (15 males and 15 females) were presented with a visual form discrimination task which required subjects to match Roman letters when a variety of transformations were held constant. Subjects were given massed practice across four blocks of eight stimuli each. The purpose was to compare the effects of practice under both the distinctive features and the schemata hypotheses. Results of a repeated measures analysis of variance showed support for the distinctive features hypothesis. This result was expected since familiar stimuli, used with transformations which are held constant, tend to produce no improvement along a practice dimension. (Dr. Tyler is with Teledyne Brown Engineering in Rockville, Md. and Dr. Hardy is with the Institute for Child Study at the University of Maryland.)

Current perceptual learning literature brings to light two hypotheses (distinctive features or specificity hypothesis and schemata hypothesis) on whether children's perceptual judgments improve with practice. The first hypothesis states that distinctive features are dimensions of object and pattern differences. Improvement of discrimination among objects or patterns consists of learning the specific distinctive features. The function of practice, then, enables one to respond to an increasing number of features and to discover which features are "critical" for defining the objects or patterns.

The second hypothesis suggests that prototypes or models of objects or patterns have been built up through repeated experiences and "stored" in memory. Improvement in discrimination would first involve building a new schemata or model for making discriminations and then matching sensory stimuli to the existing schemata. The function of practice allows for the construction and refinement of appropriate schemata (Pick, 1965). Thus, the operation starts with an individual recording data, such as various sizes and arrangements of the letter "A," and organizing them in a schemata. This

schemata is then used to direct subsequent perceptual activities involving the letter "A."

Frederickson and Guerin (1973), using psychophysical techniques, compared reduction of the Mueller-Lyer illusion among three groups of subjects — children aged 8 to 12, adults aged 18 to 25, and adults aged 60 to 70. Using a variant (red horizontal line) and an invariant (black horizontal line) as comparisons and providing no feedback, they found that practice with red horizontal lines produces greater reduction in illusion than does practice with black horizontal lines. Additionally, the sample of younger adults demonstrated greater reduction in illusion under both conditions than either the children or the older adult samples. These results were interpreted as consistent with the distinctive features hypothesis since the stimuli presented became more specific with time and practice.

Pick (1965) used cognitive psychological techniques with three groups of kindergarten children to compare the effects of practice under both the distinctive features and the schemata hypotheses. In the first group, a control condition, the children were trained on one set of stimuli and transformations and tested on a transfer task which used another set of stimuli and transformations. In the second group, schemata condition, the transfer task consisted of the same stimuli but different transformations, while in the third group, distinctive features condition, the transfer task consisted of new stimuli but the same transformations. This latter group had the fewest errors. Thus, Pick concluded that learning distinctive features of form may be a significant component for improvement in the discrimination ability of young children.

These two hypotheses may not be mutually exclusive. A basic tenet of both of these hypotheses is that the ability to discriminate the unfamiliar improves with practice, both with or without knowledge of results. Thus, the formation and subsequent refinement of a schema may necessitate the individual to notice particular distinctive features in a stimulus so that he is able to change the initial schemata that is being used to guide encoding while he is doing a task.

If, however, the stimuli are already familiar to the subjects and the transformations are the same, one would expect, according to the distinctive features hypothesis, that no improvement would occur with repetition; however, according to the schemata hypothesis, one would expect repetition to improve discriminations as one practises transformations using familiar stimuli. It is the specific purpose of this study to investigate the validity of these two hypotheses using familiar stimuli, letters of the alphabet, with a variety of transformations held constant over four massed practice conditions.

Method

Subjects

Subjects were 15 males and 15 females ranging in age from 3.10 years to 4.11 years who were randomly selected from three preschools in the Menlo Park, California, area. The mean age was 4.3 years.

Materials

The materials consisted of a portable box and 32 stimuli cards. The portable box had five plexiglass windows. These windows faced the subject. One subject response button was located beneath each of windows 2, 3, 4, and 5. Window 1 was on the far left and always displayed the target on the stimulus card. This target form was to be matched as “same” with one of the four other forms presented simultaneously in the other windows. The serial positioning of the windows encouraged subjects to search the stimuli from left to right.

During each subject’s trials, the experimenter held a small console unit with four indicator lights. When the subject pushed a correct response button, a red light flashed on the experimenter’s console unit. This arrangement allowed the experimenter to sit to the side and behind the subject making it possible to keep the subject’s attention directed towards the task while still being able to accurately determine his response.

Each of the 32 stimuli cards was a 20 inch x 6 inch (50.80 cm. x 15.24 cm.) masonite board bearing five 4 inch x 4.5 inch (10.16 cm. x 11.43 cm.) black and white, high gloss, photographed stimulus forms. Each of the five forms appeared through the appropriate window of the portable box. The forms consisted of lower-case Roman letters (a b c e f g h i j k m n o q r s t u v w y z) and were chosen from a confusion matrix (Gibson, Osser, Schiff, & Smith, 1963).

The letters were rotated and arranged into 16 simple and 16 complex stimuli cards. A simple card presented the same letter in each window. This letter was rotated in either four different horizontal-vertical positions or four different oblique positions. A complex card presented two letters in each window. These letters were also rotated in either four different horizontal-vertical positions or four different oblique positions.

The 32 cards were randomized into four blocks of eight stimuli each. The four response choices on each stimulus card were also randomized so that each of the four nontarget windows presented the correct stimulus match an equal number of times.

Procedure

Each subject received an individual reading of the instructions and was given a demonstration trial before beginning the matching task. The instructions were as follows:

You sit here and I’ll sit next to you and show you how to play a game (put card in box). Look at all these letters (point). Now look at this letter (point). Press the red button with your finger when you have chosen the letter that looks the same as this one (take card out). Now I’m going to show you some more letters. Look at each letter and press a red button under the letter that looks just like the letter in this window (point).

If the subject responded correctly on the demonstration trial, the experimenter proceeded to give the 32 trials saying each time “which letter looks just like this one.” If the subject did not respond correctly to the demonstration trial, the instructions were repeated. All subjects responded correctly on either the first or second demonstration trial.

The dependent variable was the number of error responses. To test the

distinctive features and schemata hypotheses, a repeated measures design with four levels of starting block position and 30 subjects was used.

Results

The means and standard deviations for the four block positions are presented in Table 1. The higher the score the more ineffective was the subjects' performance on the task. An examination of this table shows that block four had the highest mean score.

TABLE 1
MEANS AND STANDARD DEVIATIONS^a ON ERROR RESPONSES
ACROSS FOUR PRACTICE BLOCKS

Practice Block Positions			
1	2	3	4
2.57	2.90	2.70	3.23
(1.35)	(1.79)	(1.62)	(1.25)

^a Standard deviations are in parentheses

Table 2 presents a summary of the repeated measures analysis. The results indicated that block position (practice) had no effect on performance, $F(1,87) = 1.42, p > .05$. Since there were no practice effects, these results support the distinctive features hypothesis as opposed to the schemata hypothesis. A further examination of all possible pairs of means was made. Using a Neuman-Keuls method as described in Winer (1962, pp. 309-310), it was found that there were no significant differences, $p > .05$. This lends additional support to the distinctive features hypothesis.

TABLE 2
REPEATED MEASURES ANALYSIS OF VARIANCE WITH FOUR LEVELS
OF PRACTICE BLOCK POSITION

Source	SS	df	MS	F
Blocks	7.57	3	2.52	1.42 ^a
Subjects	113.30	29	3.91	
Error	154.43	87	1.78	
Total	275.30	119		

^a Not significant

Discussion

Table 1 indicates that errors increase with practice. The child with knowledge of the distinctive features of familiar alphabetical letters made fewer errors in the first practice block than in the fourth practice block. Repetition did not facilitate learning the unfamiliar, same type transforma-

tion. Thus, the results failed to support the schemata hypothesis, and instead, supported the distinctive features hypothesis.

One reason why this study might not have supported the schemata hypothesis is that the stimuli were too confusing. Piaget and Inhelder (1969) have indicated that four-year-old children do not perform well in tasks requiring them to deal with more than one dimension along a stimulus variable. This suggests that tasks which include more than one stimulus variable may be too confusing to the young child.

For example, in this study, the child was required to recognize letters and their transformations within simple and complex patterns. The large array of stimuli may have introduced more information than the child could use in terms of matching a prototype to a cognitive model. Practice, therefore, may have been ineffective since the children were unable to utilize information along several dimensions. However, since the children used in this study gave correct answers in approximately 64 percent of the instances, it would tend to indicate that the stimuli used were not too difficult. The argument suggesting that the stimuli were too confusing would, therefore, not be an appropriate explanation as to why the schemata hypothesis was not supported.

An alternative reason as to why the schemata hypothesis might not have been supported concerns the novelty of the stimuli. Gibson (1969) noted that practice does not facilitate form perception if the stimuli are not novel. Herein lay a difficulty in proving the schemata hypothesis. Lower case Roman letters are generally familiar forms within the visual experience of most four-year-old children. The unusual aspect of the stimuli was its various transformations. These transformations, however, may not have been perceived as unusual by the child who does not yet understand why a "d" functions differently from a "b." In this sense, transformations may have been ignored.

The results of this study clearly support the distinctive features hypothesis. Since no data is available concerning the novelty aspect of the stimuli, this argument, as previously mentioned, provides an alternative explanation of the data. Further research investigating these two hypotheses should be addressed to this issue.

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The Operator Construct of Rational Numbers in Childhood and Adolescence— An Exploratory Study*

The basis for this research is a theory of rational numbers, which sees the rational number construct of a person as potentially built on a number of subconstructs. This research explored the view of rational numbers as operators as held by children and adolescents. Subjects ranging in age from 8 to 14 years were faced with six task settings involving operator representations of the rational numbers $1/2$, $1/3$, $2/3$, $3/4$, $1/2 \times 1/3$, $1/2 \times 3/4$. Significant changes in performance level and quality appeared between ages 11 and 12 and particularly between ages 12 and 13. Based on the findings, it was hypothesized that three levels of "operator" development exist, and that subjects use such constructive mechanisms as partitioning to control the operator situation. (Dr. Kieren is a Professor in the Department of Secondary Education and Dr. Nelson, a Professor in the Department of Elementary Education, at the University of Alberta.)

The rational numbers (commonly seen in the form of fractions, decimals or percents) are of considerable practical importance. They are the numbers used to measure or label most continuous quantities and to quantitatively compare two or more entities in a multiplicative manner. They are also of considerable mathematical significance both in the area of analysis and algebra. This importance has been recognized in the significant amount of instructional effort placed on rational numbers, instances of which are to be found in the curriculum for children aged 9-14. Yet, for all this effort, rational numbers or "fractions" have historically and currently proved to be a topic in which achievement was lower than anticipated (De Morgan, 1943; Carpenter, Coburn, Reys & Wilson, 1975; Ginther, Ng & Begle, 1976).

Formal instruction with whole numbers has focussed on computation. However, it is based upon a large amount of informal and practical experience with whole number settings and counting. Instruction with

rational numbers has been based almost solely on a computational construct. This construct pictures rational numbers as objects of computational manipulation. There is little relationship here to a body of experience of children or to the broad practical spectrum. Rather, rational number computations are pictured as extensions of whole number computations. As suggested above, this approach, even carefully carried out, has not developed high standards of student achievement.

The study reported here is based on a much broader construct of rational numbers. This construct (Kieren, 1977) has, as its capstone, mature functioning in a spectrum of rational number settings. Underlying this maturity is a well developed concept of equivalence and a broad base of experience in the areas of five basic sub-constructs:

- rational numbers as part-whole relations;
- rational numbers as ratio numbers;
- rational numbers as quotients;
- rational numbers as measures;
- rational numbers as operators.

In addition, this construct includes mechanisms (e.g., partitioning) by which persons deal with the meaning of rational number situations. Many steps are required in proceeding from this complex construct to a rational number curriculum. It is an assumption of this research that one significant step is an analysis of the way in which children and adolescents react to, think about, and develop the various sub-constructs. In the case of this study, the operator construct was the focus of attention.

Purpose of the Study

The purpose of the study reported was to explore the view of rational numbers as operators held by children and adolescents. The operator construct interprets a rational number as mapping one number to another. For example, it interprets the rational number $2/3$ as relating 12 and 8, 6 and 4, 2 and $4/3$, etc. This construct leads also to the interpretation of multiplication as function composition; e.g., if one reduces a picture to $3/4$ size then the result by $1/2$, the overall result is a $3/8$ reduction ($3/8 = 3/4 \times 1/2$). The research was directed to several exploratory questions.

1. Is there a change over age of reaction to operator settings?
2. Do there appear to be stages in this development?
3. Will there be difficulties with the concept of inverse in these settings?
4. Are there differences in reaction to unit as opposed to non-unit fractions ($1/3$ as opposed to $2/3$)?
5. What mechanisms do children and adolescents use in handling these settings?

The Research

The Instrument

In order to answer the above questions, a rational number operator setting was developed according to the specifications for a good mathematical problem developed by Nelson and Kirkpatrick (1975). The setting revolved around a machine which made fractional changes in sets of discrete objects.

After trials with children and critical suggestions, the following setting evolved.¹

The subject is faced with a large colourful box with input and output doors. He or she is told that the machine is a packing machine that is programmed to work a certain way. They are to try the machine by placing certain numbers of objects into the machine and counting the output. After a number of trials (up to 6), they are asked to *predict* the result if they placed certain numbers of objects into the machine (5 items). The subject is then asked to give the number of objects needed to produce a certain output (inverse, 5 items). Finally for each task, the subject is asked to explain how the machine is operating.

The following explanation details the dialogue between experimenter (*E*) and subject (*S*) on the “1/2 machine”, with *E* saying, “You and I are going to pretend this (points to box) is a packing machine. It takes pieces of paper (points to small sheets) and packs them in boxes (shows simulated boxes). You load paper in here (points to input chute) and packages come out here (points to output chute).

“This machine is controlled by a computer that tells it how to work. Pretend you are the manager and walk into the machine room and want to find out how the machine is working. No one is around so you decide to try the machine out and see how it works.

“Why don’t you put in 12 of the sheets?” *S* counts and does so. Machine outputs 6. “Count how many came out.” *S* counts 6. Repeat the above sequences using 16, 10, 8, 18, 6 as input values.

E now hands *S* a sheet with IN and OUT columns on it. *E* says, “Can you fill out this sheet telling how many packs came out if you know how many sheets are put in?”

S then fills out the first sheet containing 5 items (all *Ss* did this without difficulty in understanding what was asked).

E now probes, “Why did you say 7 out when 14 went in?” *E* chooses several examples as deemed necessary. *S* gives free responses.

E now asks, “Can you tell how the machine is working?” Again, *S* gives a free response.

E now asks, “Can you fill in this sheet (hands inverse sheet to *S*)? Now you know how many packs came out — here on 1. 10 came out. You have to tell how many sheets you have to put in to get 10 packs out.”

S fills in sheet containing 5 items. *E* then probes as in the direct situation above.

The student is then told the machine has been reprogrammed (an analogy is made to a record player or tape player) and it is stressed that the machine is working differently. The protocol above with direct and inverse items is repeated.

In all, the subject could be faced with five direct and five inverse items on six tasks. One variable in the tasks was whether the operator involved was a unit fraction ($1/2$, $1/3$, $1/2 \times 1/3$ or $1/6$) or a non-unit fraction ($3/4$, $2/3$, $1/2 \times 3/4$ or $3/8$). The second variation in tasks contrasted single operators ($1/2$, $1/3$, $3/4$, $2/3$) with composed operators ($1/2 \times 1/3$, $1/2 \times 3/4$). In the latter case the subject was faced with two machines. The first, already familiar, put

sheets into packs. The second took the output of the first machine (packs) as input. It then put out simulated boxes of packs. These composition machines were presented using the above protocol illustrating the entire functioning of the machines in sequence. Thus the subject placed 16 sheets in the " $\frac{1}{2}$ " machine and saw 8 packs come out and be placed in the " $\frac{3}{4}$ " machine from which 6 boxes emerged. The subject after up to 6 trials with feedback had to predict the action of the composed machines.

These tasks were presented to subjects individually, with each subject allowed as much time as needed to complete the task. Each subject started with a " $\frac{1}{2}$ machine" and proceeded until he or she was unable to make predictions or understand how a machine functioned (by the subject's own statement). The subject was then briefly taught a partitioning strategy for running the machine (2 teaching trials). The experimenter and the subject reversed roles and the subject "ran" the machine. In this way, the subject's susceptibility to instruction on operators was explored.

Each subject recorded his own predictions on the direct and inverse items on attempted tasks, after first receiving up to 6 trials with manipulations and feedback. In addition the experimenter made a written record of the students' descriptions and discussions of the machine functioning.

In terms of being a viable problem, the machine setting proved successful. All of the children and adolescents tested reacted to and functioned within the setting.

The Sample

The choice of the sample in this study was influenced by theoretical and practical considerations. Since the current curriculum in rational numbers falls mainly between grades 4 and 8, a sample across those grade levels has some practical importance. This grade span reflecting an age span of 9-14 is appropriate for theoretical reasons as well. By age 9, the ability to make basic fractional recognitions should be present (Piaget, Inhelder & Syzminska, 1966), as should a minimal competence with reversibility which in turn would allow a child to function with the "inverse" situations. Because the operator construct implicitly involves ratio ideas, the relationship to the development of the proportionality schema seems important. Lovell (1971) suggests this development probably occurs between the ages of 12 and 14. Thus, it was necessary for the sample to include children up to that age level.

The study was conducted in an elementary (Grades 4-6) and junior high school (Grades 7-8) in Walton County, Georgia. The students came from rural areas and a small city. A random sample of 45 students was drawn, stratified for research and practical reasons. With the exception of Grade 4 with 5 subjects, there were 10 subjects drawn at each grade level, 5 males and 5 females. Further the sample was selected so that no more than two subjects came from any one classroom, this being done to minimize disturbance to teachers and classrooms. The age range of the sample was 8 years, 11 months to 14 years, 7 months.

Procedures

Each subject was interviewed individually in a room provided in each school for the purpose. Within schools the interview occurred in random order

with the time of each interview coinciding with the needs of the subject. The actual times ranged from 17 to 69 minutes with a median time of 44 minutes.

Each interview followed a set protocol, adapted to insure clarity for each subject. Following an introduction and development of the problem, sequences of trials with feedback, prediction trials and descriptive requests were repeated for each of the six tasks. This was always started with the “1/2” task followed by “2/3”, “1/3”, “1/3 x 1/2”, and “3/4 x 1/2” tasks. Because of performance, all students did not attempt all tasks; for example, subjects who did not have success on the “3/4” task did not attempt the “3/4 x 1/2” task. The minimum number of tasks attempted was 1 with the median number being 4.

Analyses

In order to answer the research questions posed above, the following analysis was carried out. The sample was split into four age groups as seen in Table 1 below. A one way analysis of variance with orthogonal contrasts was carried out to test the following hypothesis.

Hypothesis 1. There are no significant differences among the mean number of items correct on the operator tasks for subjects in the four age groups.

A nominal analysis was used to help determine if stages in operator thinking were observed.

Two tests of independence were conducted to test the following hypotheses.

Hypothesis 2. Performance on direct items are independent of performance on related inverse items. (e.g., 1/2 direct, 1/2 inverse).

Hypothesis 3. Performance on unit items is independent of performance on related non-unit items (e.g., 1/3, 2/3).

Results

Instrument

The content and construct validity of the instrument has been discussed above and was not formally tested. The reliability of the instrument was ascertained using the split half method and was found to be .97.

TABLE 1
MEANS AND STANDARD DEVIATIONS ON TASK ITEMS
OF FOUR AGE GROUPS

	Age Level			
	< 11	11 < x < 12	12 ≤ x < 13	> 13
N	12	10	11	12
Mean	9.4	15.5*	28.9*	31.3
s.d.	4.7	7.2	18.1	16.9

* p < .02

Age Level Analysis

Table 1 below contains the age level statistics. Hypothesis 1 is rejected ($F_{3,41} = 6.69, p < .01$). Because the group sizes are nearly equal, the analysis was held to be robust even though there were differences in the variance. Constructs revealed significant differences ($p < .02$) between subjects younger than 11 and those in the 11- to 12-year-old group and between that group and the 12- to 13-year-old group.

Nominal Analysis

The numerical differences reported above are supported by differences in the qualities of behaviour at different age levels. To get at this, a careful analysis of the kinds of tasks mastered (4 of 5 items) by each subject was made. From this and from student transcripts, six descriptive categories were developed. These and tallies at each age level are presented in Table 2.

TABLE 2
PERFORMANCE CATEGORIES OF SUBJECTS FOR FOUR AGE LEVELS

		$y < 11^a$	$11 \leq y < 12$	$12 \leq y < 13$	$y > 13$
VI	Mastered all items using proportions				x
V	Mastered unit, non-unit and composition			xxx	xx
IV	Mastered unit and composition		x	xxx	xxxx
III	Mastered unit tasks	x	xx	xx	xxx
II	Mastered "1/2" tasks only	xxx xxxxx	x xxxxx	xxx	xx
I	Mastered no tasks	xxx	x		

^a y = years of age

Some of the categories require further explanation. Category II refers to the direct and inverse tasks using the "1/2" machine. Category III concerns "1/2" and "1/3" tasks, involving fractions with unit numerators. Category IV again involves the *unit* tasks of III but also includes the composition task "1/3 x 1/2". Categories V and VI involve mastery of direct and inverse questions on all six tasks. Subjects in the former category solved the problems using numerical comparisons, while those in category VI would consider the operator as generating a *proportion*.

At each age level, performance ranged over several performance categories and there was overlapping of performance among all age levels. However, of subjects over 12, 57 percent are at level 4 or above while only 5 percent of subjects under 12 achieved that level.

Analysis of Problem Areas

By the design of the tasks, a comparison of performance on direct and inverse tasks and unit and non-unit tasks was possible. Rather than make a gross numerical comparison, performance on task pairs by individuals was considered. These data are presented in Tables 3 and 4.

TABLE 3
COMPARISON OF PERFORMANCE ON PAIRED DIRECT-INVERSE ITEMS

		Inverse	
		Yes	No
Direct	Yes	81	13
	No	1	58

χ^2 : 104.01; $p < .01$

TABLE 4
COMPARISON OF PERFORMANCE ON PAIRED UNIT AND NON-UNIT TASKS

		Non-Unit	
		Yes	No
Unit	Yes	15	51
	No	1	37

χ^2 7.48; $p < .01$

There is a significant relationship between performances on the two task types in both tables. However, for the direct-inverse comparison most students were either correct or incorrect on both items of a pair, while for the unit—non-unit comparison, almost half of the students got the unit task while missing the paired non-unit task. These relationships were similar at all of the age levels with, of course, the “yes-yes” tally increasing with age in both comparisons.

An analysis of the verbal descriptions of subjects of the way in which the machine functioned or their verbal response to items revealed two important trends. The first, which has been seen in other proportionality research, is that students thought subtractively and not multiplicatively in analyzing the problem settings. This was particularly so for students under 12 years of age. For example, in looking at the “2/3” operator such a student would say “it’s subtracting 4” (12 → 8), “it’s subtracting 10” (30 → 20) and thus never focus on the constant multiplier involved.

The second important feature, was the role “1/2” appeared to play in the subjects’ thinking. As can be seen from Table 2, over 91 percent of the subjects mastered the “1/2” task. Further, although students stated that they knew a machine was not a “1/2” machine, when confused they would give a “1/2” response. For example, with an input like 24 on the “3/4” machine, the student would predict 12 as an output. This kind of response was made by 47

percent of the entire sample and was particularly evident for students under 12, where 63 percent of the students made this kind of response.

As suggested earlier, a very tentative exploration was made of the subjects' ability to learn quickly how to function with an operator (on the first task over which they did not show mastery). Of the sample, 27 subjects showed this ability, with all students grade 6 or above who were given brief instruction, learning how to execute the operator. Below grade 6 only 6 of 15 students were able to learn how to execute the operator after the brief instructional sequence. In all cases tested, this "learning" only held for the direct aspect of the operator involved with only a very limited carry-over to the inverse or other tasks.

Discussion

The results taken from the data above indicate a strong age and stage development of students' reactions to the operator interpretation for rational numbers as given in this study. While, of course, this could be an artifact of the task design, it is probably more closely related to the onset of formal operative thinking. The performance levels indicated by V and VI in Table 2 require that the student simultaneously compare two phenomena and inter-relate them. This performance is comparable to the logical thinking described in several of the experiments in *The Growth of Logical Thinking from Childhood to Adolescence* (Inhelder & Piaget, 1958).

Taken in this light one can hypothesize three levels of rational operator development. First, there is the " $1/2$ " oriented level where a child's fractional conceptualization is dominated by " $1/2$ ". The second level is transitional and linear in nature in which the subject can handle units and compositions of *unit operators*. The third level is ability to handle compositions with *all forms of operators*. Although not observed here, there is probably a level incorporating operators into a system which is beyond those considered here.

A study of the interview transcripts reveals that thinking of operators as ratios is not necessary for achieving at the third level discussed above. In fact, only one student, a 13-year-old girl, indicated use of proportions in analyzing the machines. She was also the only one who named the composition of " $3/4$ " and " $1/2$ ", " $3/8$ " after one trial. Other subjects appeared to use a partitioning mechanism to get at non-unit operators. For example, another 13-year-old girl in looking at a 12 input, 9 output situation said "2 into 12 is 6, but 2 doesn't work with 9, 3 into 12 is 4, 3 into 9 is 3 — oh, I see" and then she applied this to prediction tasks by dividing by 4 and multiplying by 3.

The research discussed above was exploratory and the data gathered from a small sample of subjects. Yet it would appear that in building curriculum for the operator construct, development cannot safely be ignored. It would also appear that early instruction building the child's concept of fraction beyond " $1/2$ " and instruction in various partitioning tasks would be fruitful. Further, because of the variety of performance levels at each age level, individualization in terms of both goals of instruction and student strategies (partitioning vs. proportionality) in the operator construct appears to be necessary.

* This study was undertaken under the auspices of a sabbatical leave grant from the University of Alberta and with administrative assistance from the Center for the Study of Mathematics Learning and Teaching at the University of Georgia.

Note

- ¹ Dr. I. Weinsweig, University of Illinois-Chicago Circle and Dr. K. Fusen, Northwestern University provided helpful criticism.

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Effects of Play on Novel Responses in Kindergarten Children*

One hundred and twenty kindergarten children were randomly assigned to four treatment conditions: free play, make-believe play, imitation, and control. They were then given an alternate-uses test and the objects were: a paper towel, a matchbox, a paper clip, and a screwdriver. Subjects in both the free play and make-believe play conditions produced significantly more nonstandard responses for paper clip than control subjects. Make-believe play subjects produced significantly more nonstandard responses than control and free play subjects for screwdriver, the only object not present in the treatment conditions, suggesting a carry-over effect of make-believe attitude or playfulness. (Dr. Li is Associate Professor in the Department of Educational Psychology at the University of Calgary.)

There is tentative evidence for the view that play is associated with the emergence of novel responses, responses which may be employed to good effect on creativity tests (Sutton-Smith, 1973). Recent studies giving support to this hypothesis include those by Lieberman (1965), Sutton-Smith (1967), and Dansky and Silverman (1973). While Lieberman (1965) found a significant relationship between playfulness and divergent thinking in kindergarten children, because intelligence loads heavily on her playfulness scales, the exact relationship between playfulness and divergent thinking cannot be determined.

Dansky and Silverman (1973) examined the differential outcomes of playful and imitative activity and found that children in the play condition gave significantly more nonstandard uses for the objects on an alternate-uses test than children who used the objects in the imitative context or children without prior exposure to the objects. However, one cannot be certain in what way the effects of the play treatment were transferred to performance on the alternate-uses task, for example, whether the play subjects might have brought a more playful attitude to the alternate-uses task than the imitation and the control subjects.

The present study was undertaken to extend Dansky and Silverman's 1973

study, to test the hypothesis that a playful attitude may result in a general lowering of a person's threshold for novel associations, by including in the alternate-uses task an object not present during the play or the imitation condition. The Dansky and Silverman study employed only one play treatment condition, which may be described as free play, for the subjects in the play group were told, "You may play with all of these things. Do whatever you would like to do with them." In other words, the subjects are provided a free play situation, with freedom to engage in spontaneous play which may or may not involve "make-believe" elements. Qualitatively, there are several types or kinds of play, and the term "play" in Dansky and Silverman's play condition is probably used in the generic sense. Singer (1973) believes that children do not automatically learn how to play in a make-believe way, even though a certain amount of make-believe develops from the intrinsic nature of childhood growth. Furthermore, it is the make-believe aspect of play which may be associated with divergent thinking. Therefore, another purpose of this study was to focus on the make-believe aspect of play and to explore the differential effect on children's novel responses of two types of instructions for introducing the play treatment. One may be described as providing a free play situation while the other attempts to orient the child towards "pretend" or make-believe play.

Method

Subjects

The sample consisted of 120 children, 60 boys and 60 girls, aged between 4 years 11 months and 6 years 1 month. They were randomly selected from 10 community kindergartens which had been randomly chosen from all the community kindergartens in Calgary, Alberta. By community kindergartens is meant community-based programmes operated by community associations, as opposed to board-based ones, operated by the school boards. At the time of the study there were many more community-based programmes than board-based ones.

Subjects were randomly assigned to each of four treatment conditions: free play, make-believe play, imitation, and control (N = 30 in each condition, half boys and half girls).

Materials

For the free play and make-believe play conditions, the materials were a pile of 10 paper towels, 10 empty matchboxes and a pile of 30 paper clips. For the imitation condition, 10 paper towels, 10 empty match boxes, and 30 paper clips were used, in addition to 6 wet plastic cups, a bunch of toothpicks, and 15 blank cards (3 x 5 inches). For the control group, the materials consisted of a box of colouring pencils and 4 sketches. A coloured screen was placed on the table facing the subject during testing.

Procedure

The procedure was similar to that used by Dansky and Silverman (1973). All subjects were seen individually twice by a female graduate student: once for an initial rapport-building 5-minute colouring session and then a week later during the experiment proper.

For the second session, free play subjects were presented with the stimulus materials and told, "You may play with all of these things. Do whatever you would like to do with them." The free play period lasted 10 minutes. The subject could use the objects as he chose but if he disregarded any of the 3 objects, one or two prods were given in the fourth or seventh minute of the session, by naming the objects the subject had not used and indicating they could be played with as well.

Subjects in the make-believe play condition were told at the start of the second session the following story: "This is a story about a very, very clean lady. Once there was a very, very clean lady who scrubbed and scrubbed her kitchen table so hard that she wore a hole in the middle of the table. She scrubbed and scrubbed her clothes so hard that they fell apart. She scrubbed and scrubbed her face so hard that . . . guess what . . . her nose fell off! Can you imagine that? . . . Do you like playing make-believe?" Then the subject was presented with the stimulus material and told, "Let's make believe or imagine that an object could become anything you would like it to be. Play with all of these things. Do whatever you would like to do with them." The play period lasted 10 minutes altogether, including the story-telling. Again, if the subject disregarded any of the objects, one or two prods might be given as in the free play condition.

Subjects in the imitation condition were asked to watch the experimenter while she performed three tasks (fastening any three cards with a paper clip, three times; wiping all six cups with a paper towel; and putting a few toothpicks in an empty matchbox, doing it three times). The tasks were performed in random order. Then the subject was told, "Now you do it in exactly the same way that I have done with these things."

The control subjects were given a box of colouring pencils and four sketches to colour as they liked.

The four treatments were administered in blocks of four. Within each block, the first subject seen was always from the free play group, followed by one from the make-believe play group, then imitation and lastly, the control group. Each treatment lasted 10 minutes, and the amount of time the subject spent in playing with each of the three objects was recorded.

The Dependent Measure

An alternate-uses test was employed as a measure of associative fluency. The four experimental objects for the test were: a paper towel, a matchbox, a paper clip, plus a screwdriver, which was not used in any of the treatment conditions. The test was given to each of the subjects by the same experimenter immediately after the treatment condition. The experimenter randomly selected one of the four objects and showed it to the subject, saying, "You can use a _____ in lots of different ways. I would like you to tell me all of the things that you could do with it, make with it, or use it for." Once the subject stopped responding, he was asked, "Could you do anything else with it?" The subject was allowed to see, but not handle, the objects during questioning period. The same procedure was repeated for each of the four objects. The amount of time taken by each subject to complete the alternate-uses task was recorded.

Results

All responses were recorded on audio tape and were scored by two independent judges as either standard or nonstandard according to a method used by Goodnow (1969). Novel responses would be the nonstandard responses. Neither of the judges knew the subjects' treatment grouping while doing the rating. The judges agreed on 97% of the total 2,070 ratings.

Standard and nonstandard responses were analyzed separately. Multivariate analysis of covariance performed on the standard scores did not yield any significant treatment effect, which was expected. But there was a significant sex effect in that the male subjects (mean = 2.17) produced more standard responses than female subjects (mean = 1.43) for the object paper clip, $F(4,109) = 7.73, p < .01$. There was no significant treatment x sex interaction effect.

For nonstandard responses, no significant sex difference was found. Thus the sexes were combined for subsequent analyses ($N = 30$ in each condition). One-way MANOVA performed on the nonstandard scores yielded a significant overall treatment effect. Further inspection of the data showed a significant treatment effect for paper clip, $F(12,299) = 3.27, p < .02$, and for the screwdriver $F(12,299) = 2.88, p < .04$. Multiple t tests indicated that for paper clip, subjects in make-believe play condition produced significantly more nonstandard responses than subjects in the control condition ($p < .03$), while free play subjects produced significantly more nonstandard responses than both the control subjects ($p < .01$) and the imitation subjects ($p < .04$). For screwdriver, make-believe play subjects produced significantly more nonstandard responses than either the free play ($p < .01$) or the control subjects ($p < .05$). The mean number of nonstandard responses to each of the four objects for each of the four conditions is presented in Table 1. Analysis of the amount of time taken by subjects to complete the alternate-uses task showed no significant difference between groups or sexes.

TABLE 1
MEAN NUMBER OF NONSTANDARD RESPONSES FOR ALL OBJECTS

	Screwdriver		Paper Clip		Paper Towel		Matchbox	
Make-believe play	1.53	(2.00)	1.93	(2.27)	3.06	(3.17)	2.63	(2.65)
Free play	0.43	(0.77)	2.30	(2.53)	3.50	(3.25)	2.36	(2.54)
Imitation	1.03	(1.92)	1.16	(1.53)	2.26	(2.12)	1.93	(1.78)
Control	0.73	(0.94)	0.90	(1.30)	2.80	(2.68)	1.80	(2.40)

Note. Standard deviations are given in brackets.

Discussion

Analysis of the data yielded a significant treatment effect for nonstandard responses for screwdriver in favour of the make-believe play subjects, and for nonstandard responses for paper clip in favour of both the free play and make-believe play subjects. With regard to standard responses, no treatment

effect was found but a significant sex effect was found for paper clip in favour of boys.

The results of this study lend some support to the hypothesis that a playful attitude facilitates associative fluency. The findings of a significant treatment effect for screwdriver in favour of make-believe play subjects is of importance. Since none of the children had played with or handled the screwdriver during the treatment session, the responses to the alternate-uses test for this object might have been affected by the child's frame of mind or attitude during treatment. The introduction of make-believe elements in the instructions seems to have greater facilitating effect than just asking the subjects to play with the objects. One might infer a possible transfer effect of a make-believe or imaginative playfulness. The results are consistent with that of a recent follow-up study by Dansky and Silverman (1975) which used objects not involved in any of the treatment conditions for the alternate-uses task. An intellectual task condition was added to the play and the imitation conditions. The only variable differentiating the three groups was the nature of the activity engaged in before the subjects were given the alternate-uses task. They found that the subjects in the play condition produced significantly more standard and nonstandard uses than did the subjects in either the imitation or intellectual task condition.

The unexpected finding of a significant sex effect for standard responses for paper clip is somewhat difficult to explain. A visual inspection of the mean standard uses for this object shows that boys give more standard responses than girls for every one of the four conditions. But an inspection of the nonstandard scores shows that while there was no significant sex effect, the boys' mean for nonstandard uses is higher than that of girls for the free play condition, but the reverse is seen for the make-believe play condition. This, together with the significant treatment effect for nonstandard responses, suggests that instructions introducing make-believe elements into the play condition may have greater facilitating effect for girls than for boys in terms of generating nonstandard responses. However, the need for caution in such an explanation is recognized. In summary, the present findings can be said to add to a growing literature supporting a relationship between play and divergent thinking. However, to determine more exactly the differential effects of free play and make-believe play on associative fluency, a more powerful design would be needed.

* This study was supported by a University Research Grant from the University of Calgary.

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Planters and Pedagogues: The Social and Political Implications of Education in British West Indian Slave Society

This article utilizes the findings of a far-reaching and detailed analysis of evangelical missionary education in the British West Indies during the years of slavery and apprenticeship, 1800-1838. The archives of four London-based missionary societies, as well as primary source materials from other organizations, provide the basis for the argument. Two contending groups, planters and missionaries, proved to have antithetical assumptions about the provision of education to slaves. Missionaries in this case did not always operate in the interests of the dominant white power group and neither did they unequivocally inculcate traditional values which reinforced the existing social order. (Dr. Rooke is a Sessional Instructor in the Department of Educational Foundations, The University of Alberta.)

The path to educating, even christianizing, another man's "property" is fraught with difficulties, for the common presumption in a slave society is that "knowledge and slavery are incompatible" (Whiteley, p. 13; Sydnor, p. 53). Just as the whip is indispensable to slavery so is ignorance necessary for subservience. For one group to maintain absolute tyranny over the persons, production, and reproduction of another group, they must also possess the means of preserving that power. Such preservation included a monopoly over law and education.

Until 1823, when the official Church of England in the colonies was directed under Act of British Parliament to increase religious instruction to bondsmen, custom and sanctions against such instruction had minimized any opportunities. The slave laws of the American South had expressly forbidden any education to slaves. In the case of the sugar colonies, a similar preclusion modified only as public opinion increased in Britain in favour of slave emancipation. With this changing political climate both planters and clergy came under attack for their neglect and disinterest in converting slaves. Abolitionists, evangelical churchmen, liberals and missionaries alike

were committed to the belief that a moral and religious preparation for freedom was imperative.

The planters were disgruntled at the public debate on gradual emancipation but appeared amenable to the British directives. However, this was an insincere attempt to stem the mounting tide of criticism against the excesses and abuses of the plantation system. At no time did their sudden and expedient tolerance include any intention of allowing the teaching of reading or writing as part of the religious instruction. These remained clearly prohibited. In addition to the planter preference that *strictly religious principles* be inculcated by oral means only, they preferred that any such instruction be given by Church of England clergy. For example, as late as 1823, when Parliament was debating the Melioration bill, the planters and official church clergy in Barbados were still enjoining missionaries that their methods must remain “strictly oral” (Fulham Papers). *The Colonist* in the same year was insistent that if slaves must have religious instruction then it must come from “regular bred clergymen” and not from missionaries. It believed evangelical preachers found it impossible to preach “the pure word of God, unpolluted with sedition.”

The dominant white class in the British West Indies viewed evangelical missionary education with profound suspicion, and literacy as the initiation of the negro population into subversion.

It remains to ask several questions regarding missionary education to slaves. (1) In which ways did it reinforce the prevailing assumptions of slave society? (2) To what extent were missionaries perceived as being conservers of the existing school order? (3) Did the missionary group identify themselves as part of the dominant white power group? (4) What was the response to missionary education?

Missionaries and the Prevailing Assumptions in Slave Society

The first question is perhaps more crucial than the others for in many ways the answer to the others rests on the first case. It is apparent that “education” of any sort does not reinforce the prevailing assumptions either about slave societies, or about slaves. It is, indeed the very antithesis to them. Today we are often tempted to dismiss missionary education as mere “indoctrination.” It is quite certain, however, that planters were unwilling to see it so simply. They found it impossible to dismiss and saw whatever was going on in the chapels and schoolrooms as distinctly problematic. Had only those Christian precepts such as obedience, submission, and gratitude been indoctrinated, missionaries would have been both applauded and welcomed. Instead, they were detested and subjected to hostile social pressure. Once reading and writing were introduced, then clearly the planters viewed something as occurring which was more than mere indoctrination.

Richard Watson, Secretary of the Wesleyan Methodist Missionary Society (WMMS), shrewdly observed that the white class, knowing “that knowledge was power,” could not “conceive of how this power could be communicated” without endangering themselves. Thus, “the prejudice against schools [was] much stronger than against preaching” (1817, p. 9). Mr. Raynor, a Methodist in Antigua, agreed. “Nothing can prevent the Creole Negro from gaining that

power while he has intercourse with those who possess it" (Item 31, 1814). The missionaries were not only preachers but also pedagogues who taught systematically, deliberately, and according to the common methods of their day. Although they trusted much to the power of the Holy Spirit, they did not rely entirely upon it to convert slaves! Their content was predominantly scriptural but it is known to have included reading and writing and, on occasion, history, geography, arithmetic, and natural science.

In the light of those constraints placed upon teaching literacy skills it came about that missionaries most strongly objected to slavery itself. Slavery interfered with teaching slaves to read, and reading the scriptures was deemed imperative to Evangelical Protestantism. Scripture reading was seen as a prerequisite for conversion. Therefore, missionaries strenuously urged the planters to lift the prohibitions placed upon teaching literacy. However, the only methods of instruction "remotely approved" of by the owners of slaves were either oral means or by catechising. It might seem that the injunctions on catechising would be satisfactorily received by missionaries; in fact this was not the case. Generally they agreed with a description of catechising published in the *Anti-Slavery Reporter* of 1831. "Catechising" was agreeable to the planters only because it was "a most ingenious device for training teachers to teach nothing" (p. 472). Missionaries such as John Wray thought that catechising was a useful method only if used as an instructional aid. They had grave reservations about using catechising as the sole method of transmitting religious precepts and considered it an inadequate method for conveying other subjects. Furthermore, although Wray's licence was under "strict injunction" not to introduce literacy skills, he cheerfully ignored such an order, as did most of the other missionaries.

If it is somewhat surprising to find missionaries reluctant to catechise solely, it comes as a further surprise to see the methods they did prefer. By no means did these men only preach the gospel or convey their message through exhortation and moral suasion. By far, they preferred to use the familiar and carefully systemized pedagogical methods of their day. These consisted of the Lancastrian or British System. In 1809, John Davies of the LMS had already printed his own series of lessons based on those of the British and Foreign Schools Society (BFSS). These lessons were adapted to the children "of the Black and Coloured Population." In addition to these, the London Missionary Society (LMS) men in British Guiana used the Infant Method which was particularly innovative even in Britain itself. As this method had been barely introduced to the Mother Country in the twenties, the dissemination of its principles into Berbice and Demerara in the early thirties is noteworthy. Between 1830 and 1834 most LMS men were proving themselves advanced pedagogically by using a method, the Infant Method, based upon Pestalozzian object lessons and sense-data principles, the use of illustrative teaching aids such as maps, charts, and pictures, as well as the encouragement of rhythmic exercises.

A basic assumption of missionaries was that all men were equal in the sight of God, therefore it was necessary to bring all men out of ignorance so they could either choose or reject Christianity. For slave owners such an assumption was objectionable because their economic and social system operated on the opposite assumption — that of the basic inequality of men. To teach a slave that he was spiritually equal to a white man was seen as the

first step to having him wonder why it was that some men could own another group of men. This sentiment was aptly expressed in *The Colonist*, 1823.

For a WHITE man and a minister to take a negro slave by the hand, and ask him how he does is a compliment which he seldom meets with and can very rarely expect; to address a promiscuous audience of black and coloured people, bond and free, Christians and heathens, by the endearing appellation of "My brothers and sisters" is what can be nowhere heard except in Providence Chapel, or peradventure Ebenezer Chapel.

Planters had always been concerned about the "consequences" of christianizing slaves, as a statement in the *Royal Gazette* of 1808 indicates. "Will not the negro conceive that by baptism . . . he is as creditable as his Christian white brethren?" Thus we can understand planter resentment of a group of white men who obviously believed otherwise about the nature of negroes and slaves. Missionaries saw the slave neither as noble, as advocates of the "Noble Savage" would depict him, nor as brutish, as others would make him. Therefore they sought to christianize slaves because Christianity was believed to be synonymous with civilization. Here was yet another assumption in disagreement with those prevailing in slave society. Planters rejected ideas of civilizing slaves for they were seen as "wild, savage, and barbarous in the extreme." Civilization implied capacity for some refined learning and intellectual proficiency, neither of which the missionaries doubted negroes were capable of. Planters were convinced that only "the iron rule of harsh authority" could restrain their "unexampled atrocities." That was why their slave laws were "rigid and inclement" (Bridges, *The Annals*). Missionaries insisted that the opposite was the case. Christianity would, said the Secretary of the Wesleyan Methodist Missionary Society (WMMS), "modify violent passions, and reform laws." It would "civilize, cultivate knowledge, morality, and domestic habits" (Watson, 1824, pp. 13-17). As James Stephen had observed in *Slavery in the British West Indian Colonies* (1824), "Mere interaction with the white race" would not civilize slaves but only "religious instruction could" (p. 202). Those heathens, previously "incapable of culture," must be brought to civilization by stressing the lessons of morality and piety (Observations, 1827).

There is much to be said concerning the racial attitudes of missionaries in the West Indies. We might not fully agree with O. W. Furley (1965) that they were "pioneers of a new racial society." However, neither can we deny that, for want of a more historical term, there is sufficient evidence that on the matter of race, missionaries "were ahead of their time." Certainly their attitudes towards matters of race were based on distinctly different assumptions than those of the broader society. Although an essay on this aspect could be documented, let it suffice to observe that there *is* that evidence. There is, however, also evidence demonstrating a subtle but discernible shift in their racial attitudes during apprenticeship, 1834-38. A niggling ambivalence which can be observed during slavery finally asserted itself during this crucial period as another sad commentary on the tensions between the theories and practices of many ideologues, religious or secular. Nevertheless, planter perceptions of missionaries included notions of a racial egalitarianism their society could neither understand nor withstand. In a world whose structures and conventions seemed crumbling around them, they could not distinguish spiritual impartiality from socio-political equality.

They could not construe where fine words such as Knibb's might lead. "I look upon the matter of slavery," he said before a meeting at Exeter Hall, August 15, 1832, "as one of religion and morality. All I ask is that my African brother may stand in the family of man" (Religious Persecution, p. 9). Planters' fears were in some ways exaggerated and unwarranted. Almost certainly the missionaries were men enough of their time and culture not to believe a negro, slave or freed, was actually as good as an Englishman. The words of a sermon in 1817 probably typified most of our missionary samples on the matter of absolute equality.

Who would exchange the general character of Britons for the cozenage and perfidy of the Chinese, for the servility and duplicity of Hindoos, or for the brutish ferocity of American savages? (Harris, p. 125)

During apprenticeship, for example, a coloured catechist, William Trotz was described as his "piety" being "fine," but his "proficiency [was] limited." Another coloured catechist was definitely kept in his place by the Director of the LMS. The Director sanctimoniously reminded the catechist, who asked to be ordained a minister, that God's wisdom had created "the various orders of men" (Haywood, 1839; Ellis, 1838). Naturally the coloured catechist was expected to be among the least significant of these orders. Nevertheless during slavery such reservations were less commonly made public. Indeed they are unusual to find even in the private sentiments of missionary correspondence. The words of John Armstrong of the CMS were more typical. He exclaimed that slaves were *not* "a set of stupid automaton which can never learn nor are fit to be loose" (1830). Mr. Raynor of the WMMS had claimed some years before that many people of colour had "more correct knowledge of men and things as well as doctrines and language than many of our preachers at home and are much more ready to notice defects in the above particulars than the greater part of our regular hearers in England" (Item 31).

In slave society, a slave was listed in an inventory, below buildings and land, and just above the livestock (Walker, p. 159). The white classes justified their dominant position on pseudo-scientific theories which graded the slave just above an "orang-outang" or of a separate *genus*. Some theology justified the condition of slavery based on colour because negroes were seen as the descendants of Ham, Cush, and Put. In such a society missionary education takes on added significance and can be seen in terms other than mere proselytization. It was a visible and defiant contradiction of many of the society's prevailing assumptions. When missionaries introduced literacy skills into their schoolrooms it was no longer just a contradiction. It was seen by the dominant white society as an insolent threat to social order.

Missionaries as Conservers of the Existing Social Order

Any education which postulated assumptions about the moral, intellectual, and spiritual equality of slaves and free white men cannot be seen as conserving the existing social order which presupposed the very opposite. As religious instruction implies at least rudimentary introduction to formal learning, we come back to that missionary assumption which reveals the main source of contention between missionaries and planters. That assumption asserted slaves could be civilized and must be Christianized.

Planters feared that learning might lead to “uppity” or cynical slaves. If reading intruded, this might well lead to civil unrest, for who knew what might be read and by whom, or for what purposes? (Waddell, pp. 17, 34; Wray, 1813; Smith, 1818). Under the circumstances it cannot confidently be asserted that missionary education was either conserving the existing society or perceived to be by those whose interests were best served by conserving it.

Had missionaries merely *believed* that slaves were equal to whites in the sight of God, few planters would have been unduly disturbed. However, these zealots did not only believe this but they acted upon such beliefs. Missionaries built schools and chapels, nursed the sick, cared for the aged, instructed the youth, socialized with the meanest slave, and lived in close proximity to the most contemptible stratum of society. They “ingratiated themselves with the lowest class” (Van Cooten, 1815). Understandably, even if quite mistakenly, such acts of charity were thought to be signs of political radicalism. Although we, as latter day observers of past events, might smile a little at the prospect of political radicalism among nineteenth century evangelical missionaries, we must not be too hasty or too supercilious. Let us then examine the evidence.

The missionary record on the subject of slavery is not as negligent as might be suspected. As early as 1811, Wray returned to England to complain about conditions on plantations. Many missionaries lodged official complaints about conditions and treatment of slaves and about abuses by particular managers, attorneys, or planters. Several published exposés in the British press and were themselves tried for libel and slander by those planters they exposed. Breaches of trust over the rights of slaves to practise Christianity were brought before the Colonial Office by missionaries (Reckord, 1971). William Knibb was rumoured in the British and Colonial press as contributing his and his Church’s leadership to the Jamaica Rebellion in 1831. Although the rumour was unfounded, the militancy of some missionaries in this period was not. Knibb and another Baptist, Thomas Burchell, campaigned against slavery in England before Emancipation came in 1833 (Narrative, p. 18). Evangelical missionaries were quickly perceived by the planters at least to be exceedingly sympathetic to the Abolition of Slavery campaign. John Davies wrote in 1812 that the Abolitionists were “the friends of humanity” and that he loved William Wilberforce “from the heart.” Wray complained about treatment of slaves and religious persecution to such eminent abolitionist leaders as Wilberforce, Macaulay, and Stephens. He also lodged official complaints to the Governor of Berbice about restrictions on religious liberty. Thomas Jones of the CMS also wrote to abolitionists such as Thomas Fowell Buxton and Henry Brougham in 1826 (CW/051/2).

The official instructions from the London missionary societies insisted that their agents were not to involve themselves in political or secular affairs, but the actions of all missionaries was not always in accord with such instructions. Therefore the official statements might give an inaccurate picture of missionary collusion. For example, W. K. Betts of the CMS had been cautioned in 1825 “to use peculiar circumspection and prudence” concerning the temporal conditions of slaves (Proceedings, 1825, p. 148). In turn the CMS monthly meeting of November, 1828, re-issued instructions warning its agents to avoid “secular concerns and political affairs.” All societies during the years of slavery gave their missionaries similar instructions and

warnings. Nevertheless, the missionaries particularly ignored such warnings when it came to the restrictions on reading. Moreover, they taught reading at most of the missions. "True Believers," despite restrictions, are prone to overcome obstacles, either by defiance or circumvention, and missionaries proved no exception. Though managers and governors themselves might be "adverse to reading," John Smith admitted that they "taught it by Stealth" (1823). Wray argued with Governor Murray of Berbice that the Governor's fear of "bad books" was quite unfounded, given that "good books would instill good principles." He rather indiscreetly added that domestic slaves learned no more vice from bad books than by "listening to the white population" when they served their masters at table (1813).

Given the pressures against teaching reading, it is really astonishing how many missionaries either flagrantly or clandestinely disobeyed instructions regarding the matter. Many of these made no efforts at all to disguise the fact. Indeed their Missionary Society journals such as *The Missionary Herald*, *The Baptist Magazine*, and the *Evangelical Magazine* frequently contained extracts from their correspondence which described their pedagogical practices, and the teaching of literacy skills was frequently among them. The argument might be made that missionaries taught literacy only when the political climate in England was against the planters and there was much agitation for gradual emancipation. During the heightening political campaigns, missionaries gained much public support because of several unfortunate incidents of persecution against them. In Demerara a LMS missionary had been so harassed and intimidated that following the 1823 Demerara Slave Revolt he and some Christian slaves from his chapel were arrested as chief instigators of the insurrection. Governor Murray of British Guiana wrote to Lord Bathurst in 1823 and said, "It is evident that this mischief was plotted at the Bethel Chapel . . ." (CO:111-53, p. 10). Smith was sentenced to hang but was granted mercy. However, he died in prison and his case raised a hue and cry which resounded in abolitionist circles.¹ In the same year a Methodist, Mr. Shrewsbury, was hounded off the island of Barbados after a riot which his presence in the colony had purportedly precipitated. His Methodist chapel was totally destroyed (An Authentic Report, pp. 17, 59). Both were well published events. Nevertheless, the sympathy they roused in the twenties does not explain why the missionaries defied prohibitions on reading even at the outset of their missions. It only explains why they grew increasingly more bold about the matter during the twenties.

The following are some illustrations which reveal the extent to which reading was imperative for missionary education. Wray, of the LMS, in Berbice, was teaching reading according to the Lancastrian Plan as early as 1813 (Extracts). Phillippo, a Baptist in Jamaica, operated his day and Sunday schools from 1825 on with a mixture of National and Lancasterian methods (Underhill, p. 75). Hurst, an Antiguan Methodist, was requesting a printing press for Sunday school lessons in 1814 (Item 58), and Dawes of the CMS, a few years later found the National System "objectionable" and his own reading methods preferable (1828, pp. 24-27). In 1810, John Davies of the LMS was asking for a shipment of Murray Spellers and four years later, for copperplates to teach the Langford system of writing (1810; 1814). In 1814, the Baptist Missionary Society (BMS) requisitioned 200 copies of *Watt's Hymns* and 300 copies of *Rippon's Selections* and scores of tracts for Jamaica (BMS

Proceedings, p. 90). One cannot suppose these quantities were ordered not to be read. The documents are replete with similar evidences and it remains puzzling why some scholars still insist that catechizing was the preferred method and that missionaries were deferential to planter authority in all things.

So far it has been demonstrated that the missionaries' presence in the sugar colonies ran counter to the prevailing assumptions of slave society. There was dissonance in several areas including the existence of schools for slaves and particularly over the teaching of literacy. In addition to christianizing and educating slaves, they fundamentally disagreed with the rest of the dominant white society on matters of race. Moreover, missionaries generally objected to prohibitions on reading and as a rule ignored such restrictions which might impede their work. A small body of missionaries actually articulated their discontent over slavery and they protested the repression of religious freedoms. These evidences put into doubt claims that the missionary presence conserved the existing social order.

Elsa V. Goveia, *Slave Society in the British Leeward Islands*, (1965) argues that missionaries reinforced the existing sanctions to slave society.

Though the missionaries deliberately stood somewhat apart from the local white society . . . they were nevertheless contributing an active and powerful reinforcement to the many sanctions already making for the internal stability of the slave system. For far from being a threat to the social order, the increase of the Christian missions was calculated to maintain and strengthen slave society (pp. 323-4).

This may have been the case for the end of the eighteenth century although even that is doubtful. It was not the case in the West Indies during the second and third decades of the nineteenth century which saw a considerable "increase in Christian missions."

Missionary Identification with Dominant Power Group

At this juncture it is appropriate to examine the third problem postulated in this paper. To what extent, it asked, did the missionary group identify with the dominant white society? It is accurate, of course, to observe that as white men, and comparatively educated white men at that, they were logically a part of the dominant white class. However, as the preceding quotation tells us they "deliberately stood somewhat apart from the local white society." Their alienation was partially self chosen as a type of seige mentality but it was also caused by the irritation they caused in others by their rather self-congratulatory piety. If missionaries considered that "intimacy" with the white population "would not do" (Carter, 1830), neither did the majority of planters seek out their company. Thus Smith could lament that he was "as much shut out from civilized society" as if he were in the "interior of Africa though surrounded by Europeans" (Smith, 1816). Thomas Burchell of the BMS observed, "No Englishman would be treated with as much contempt as a missionary in the West Indies" (1849, p. 169). Their views of education, religion, slavery, morality and miscegenation, were odious to the majority of the white population.

Desegregated chapels were not uncommon in mission stations despite the

“offensiveness” of the practice to others (Wray to Burder, 1818). Wray’s comment did not pass unnoticed, and neither was it intended to, that “white men and coloured women sleep together . . . but will not sit together in God’s house” (Wray, 1818). Their emphasis upon continence was only as aggravating as their emphasis upon matrimony, given the colonies were not partial to either. It was simply intolerable to be publicly told by Wray that your society was “a complete brothel” or as Mr. Talboys thundered, that you would be “burning in hell” while the coloured population enjoyed “blessings in heaven” (Wray, 1816; Talboys, 1816). Neither did missionaries stop at telling slaves their master’s duty toward them, with the masters themselves present (Knibb, 1825). Similar remarks can be found peppered throughout the public record in pages of *The Missionary Register*, *The Anti Slavery Reporter*, *The Christian Remembrances*, and *The Baptist Annual Register* and were read by the planting class. The planters did not see missionaries as appendages of themselves nor as conservers of social order. In turn, missionaries saw the planters as “deists, fornicators, tyrants, and sabbath breakers” (Wray, 1813).

There is evidence which suggests that missionaries did identify with conservative social values and even to the extent of inculcating desirable social attitudes. Such attitudes were intended to produce an industrious “and grateful peasantry.” Thus claims were made by missionaries not only to their good intentions but about the laudatory consequences of their systems of instruction. William Dawes of the CMS, for example, assured the planting class that religious instruction was only intended to make slaves “good Christians, and, of course, useful members of society in their humble stations” (Item 93). Planters remained unconvinced that slaves would be rendered “diligent, faithful, patient, and useful” (Quarterly Chronicle, p. 521). Indeed, Wray was accused of teaching the slaves to live “above their stations” (CO:318-89). This accusation was gloomily predicated on a general belief in England itself about education of the poorer classes. Literacy, indeed any form of education, would teach the poor, and certainly slaves too, “to despise their stations in life. . . . It would render them fractious and refractory” (Hammond & Hammond, 1920, p. 66).

That John Wray had written a catechism for bondsmen on the subject of inculcating sociably acceptable attitudes apparently did not convince the planters in the Crown Colony of Berbice either. The catechism included the following questions and answers in the section “The Duties of Servants and Slaves to Their Masters and Mistresses and Managers.”

Q. Suppose a servant, or slave, meets with an unfeeling master; does that lessen the duty of respect?

Ans. By no means, for it is the command of God, First Peter 2:18-19, “Servants shall be subject to your masters with all fear . . .

Q. What is the duty of servants as to the property of the masters?

Ans. To keep from, and watch against the sins of theft, waste, negligence, and to be careful of their master’s property as if it were their own.

Planters knew such intentions were, in the long run, doomed to failure. The Methodist Rev. Hope Masterton Waddell (1863) also knew that ideas about producing “happy slaves” were sheer whimsy. A slave might appear docile, or grow cunning and calloused, but the urge for freedom was always there.

Man is also an improveable animal, and the worse his condition is, he must the more desire an improvement of it, to the extent he sees enjoyed by others. . . . No mere improvement of the state of slavery will fully satisfy those subjected to it. (p. 67)

Although other missionaries undoubtedly agreed with Waddell's diagnosis of slavery many still insisted that their education was conducive of submission and "uniform obedience." Why then did they so often express such sentiments knowing full well, as did Smith, that learning was correctly perceived by planters as being in the long run "subversive to good order, the slave would be made too wise" (1818). There are three possible reasons for either their belief that education to slaves could promote obedience and goodwill, or for their stubborn reiteration of that belief, although some of them may have doubted its probability.

Firstly, missionaries did not see their role as political. Theirs was an expressly moral crusade; they were there to save sinners from the slavery of sin and not from the sin of slavery. They may even have genuinely believed it was possible to produce good Christian slaves who would accept their position in an unjust society by hoping for justice in the after-life. A second explanation however, is more likely. Missionaries were "guests" in a hostile environment. That is, they were allowed to remain in the colonies at the discretion of legislatures which were controlled by planters. They had generally come to the Caribbean uninvited and, as the cases of the Rev. Shrewsbury and John Smith demonstrate, they could be forced out or wretchedly persecuted by choosing to remain. Some missionaries actually resided on sugar estates because a few planters requested their services. Although the majority of the white class treated missionaries with contempt, it was not always so as the "Declaration by Managers, etc., or East Coast Plantation of Beterhoop, Demerara," in 1808 indicates. This declaration approved of missionary activities on the sugar plantations as long as it could be determined that no reading was occurring and that the cardinal virtues were being inculcated. Besides, a few planters were astute enough to realize that having a missionary work for them made for dependence and that missionary's activities could be supervised more closely. Missionaries did not prefer this situation for it often called for an uncomfortable compromise of their principles. On occasion, as with the CMS in Jamaica, some attorneys and managers of estates actually sat on the society's local auxiliary committee (Stearne, 1830). They were in the position of reporting back to the Parent Society in London if the missionary concerned who worked on their estates was not cooperating. In such circumstances some missionaries found circumvention of restrictions impossible and aloofness from the white population impractical to maintain.

In the final analysis, the Colonial Legislatures and Assemblies had the power to revoke licences to preach and teach or refuse to issue such licences. Neither did they stop at wielding this power. Thus we can see the pragmatic reasons behind some missionary capitulation and understand the instinct to treat warily rather than offend those who could put a whole mission in jeopardy. One could not depend on governors' support. They were constrained by their situation, even if against slavery. One governor during the trial of Missionary Smith was himself a slave owner and planter (CO:111-46). Smith referred to him as a man "who sets his pace against the moral and religious

improvement of the slaves, but he himself is a party concerned and no doubt solicitous to perpetuate the *present* cruel system" (CO:111-42).

Thirdly, those missionaries who insisted that theirs was an education which encouraged appropriate Christian values such as gratitude and obedience, may have been keeping the safety of their slave converts in mind. The Demerara Slave Revolt had been a warning that Christian slaves would be the first to be accused of inciting riot in times of political backlash. Quamina, the head Deacon of Bethel Chapel, was tried for being the chief insurgent. Quamina had been described by John Smith as "the most sensible negro belonging to Success (plantation)" (CO:111-46). The Slave Rebellion in Jamaica in 1831 was significantly called "The Baptist War" and many Baptist and Christian slaves were brutally rounded up after the insurrection and executed. Therefore, given that few members of any given group of men are willing heroes or martyrs, it is not surprising that some missionary sentiment appeared to be capitulating and compromising. Sometimes expressions of capitulation proved embarrassing to other missionaries. The best known scandal caused by capitulation, and often used as evidence that missionaries as a group identified with the white population and supported the social order, was the case of the Jamaican WMMS. The Wesleyan Committee on that island published a series of resolutions in the *Jamaica Royal Gazette* in 1824. These resolutions included statements which assured the planting class that missionaries did not see slavery as incompatible with Christianity and that missionaries did not approve of Abolitionist sympathies. Such resolutions were disavowed by the Wesleyan Conference in Britain and the Parent Society. That the Wesleyans involved were severely chastised and made to withdraw their statements suggests this case in no way typified the general missionary feelings about slavery. Indeed their correspondence reveals uneasy consciences and much private agonizing on the matter.

Moreover, missionaries from the four evangelical societies did not themselves participate in slave or plantation ownership. Unlike the Moravian missionaries who cooperated harmoniously with slave society, the four missionary societies, representing Wesleyan Methodists, Baptists, Independents, and the evangelical party of the Anglican Church, saw participation in either forms of property as "impolitic." Furthermore, it was felt that involvement in the plantation system was "injurious to the cause of evangelical religion" (Items 173, 175; Minutes, p. 402; BMS Book 7, p. 136). In a society where being "white" automatically guaranteed political and social superiority, the rejection of such fundamental economic values of the dominant white class set missionaries apart. It may be concluded, then, that missionaries did not identify with the dominant power group on matters of assumption, practices, or private conduct. Their verbal identifications were on matters of cardinal virtues, which it must in all honesty be said, were as applicable to white society as to slave society. Slave or free, white or black, rich or poor — they were equally required to demonstrate those Christian precepts of gratitude and humility. For those less militant missionaries, inactivity was probably as much evidence of pragmatism as it was of identification with slave owners or slavery. It cannot be seen as tacit approval of a system which after all suppressed their reason for being in the West Indies. This reason was to teach slaves and convert the "poor heathen."

Planter Response to Missionary Education

The fourth question this paper addresses itself to is, perhaps, the easiest to answer. Indeed it has already been partially covered in the preceding three arguments. What was the nature of planter response to missionary education? Let us make no mistake about it, the planters muttered about "the missionary business here" (Van Cooten, 1815). And they did more than mutter. Given the circumvention of laws and prohibitions, of which planters were fully cognizant, they saw these intruders as interfering prigs and canting dissemblers not above duplicity themselves. The West Indian press was virulent against missionary activity which they perceived as a threat to social order. Certainly the education of slaves was not generally seen as in the best interests of slave society. The *Colonist* in 1824 printed a vituperative article which claimed that missionary education would lead to radicalism. Slaves must remain as they were, that is, ignorant, because it was firmly believed that "SLAVERY MUST EXIST AS IT IS NOW OR IT WILL NOT EXIST AT ALL." The assumptions of slavery could not accommodate the assumptions behind missionary education. In 1817 John Wray was called "a hired spy" in *The Guiana Chronicle* and six years later *The Colonist* was continuing the tradition of accusing missionaries of subversive activities. The planters sporadically attempted to forbid preaching, restrain religious freedoms, harass missionaries, disturb chapel services, destroy chapels and intercept missionary mail.

Missionaries felt sufficiently intimidated to take precautions lest the content of their lessons and sermons be misinterpreted. John Smith in 1817 omitted a passage from a sermon which contained references to God "promising deliverance [of Israelite slaves] from the land of Canaan" (CO:111-42). He was conscious that his intentions might be misconstrued by planters or that negroes might see the analogy and become restless. Planters tampered with missionary teaching methods, interfered with the conduct of their classrooms, and censored content to be transmitted. *The Guiana Chronicle* in 1824 objected to certain hymns whose verses it felt, could not be dismissed as mere theological metaphor.

Oh when Africa's sable sons
Enjoy the heavenly word,
And vassals long enslaved become,
The freedom of the Lord.

In 1832, Lord Mulgrave of Jamaica recorded his impressions of missionary presence in the West Indies. Clearly missionaries were seen by planters as usurpers of social order. Mulgrave observed that "the greater part" of the population was "exasperated to the last degree against the Baptist missionaries, whom they firmly believed to have been at the bottom of the rebellion . . ." (Jones, 1963). Of course it would be absurd to maintain that the missionaries actually encouraged civil disorder and violent rebellion, but their presence and their teachings were attributed to some power for being able to do so. Even those whites who were not "violent" against missionary education feared that it must "ultimately have a bad effect" (Smith, 1817; Stephens 1824, p. 451).

William Green's claim in *British Slave Emancipation* (1976) must be modified. Missionary education was more than just "a means by which the established classes could tame the multitudes, repress social barbarism and

preserve their own superior status" (p. 327). Some planters saw such uses during slavery but the majority did not. It was only after slavery officially ended in 1833 that planters actively sought missionary cooperation in training the ex-slaves to industry and subservience. They then saw the advantages of a religiously conservative and class-oriented missionary education, but that was only after much of their former power had been wrested from them. Slavery itself had provided the perfect means for "taming the multitudes." During that period their own "superior status" had been preserved by threat and coercion.

Conclusion

Missionary education during slavery transmitted traditional moral values and conservative religious precepts. Nevertheless, the effects of their education cannot be seen in such simple terms as crude social control or as a reinforcement of slave society. Their main goal was to convert sinners but in doing this they provided a rudimentary education for part of the slave population which may otherwise have had none. Because consequences are historically more significant than intentions, the number of literates produced is more important than the number of converts. This has been similarly argued by Thomas Laquer in *Religion and Respectability* (1976) which provides a challenging reinterpretation of the Sunday School movement.

Further to this, missionary education was for the most part the *only* means by which slaves and freedmen could enter the white world. We may somewhat gratuitously see this entry as capitulation or even as white imposition but this would indeed be a hasty judgment. Eugene Genovese has argued for the psycho-social significance of "black" religion in his book *Roll Jordan Roll* (1974). The West Indian situation might be similarly explained in light of the leadership which came out of the missions during and after slavery. If missionary education offered nothing but "pie in the sky," it seems curious that the planting class was almost uniformly adverse to it. The claim has been made by various scholars such as E. P. Thompson (1968), Hammond and Hammond (1920), G. Kitson Clark (1967), and Elie Halévy (1961), that the Methodist Movement in the British working classes helped produce organizational structures, cultural cohesion, future secular leadership (as distinct from radical leadership), group identity, aesthetic and psychological expression, and written and verbal skills. Much of this, including Genovese's work, has been written from a Marxist perspective. I contend that such dimension gives us additional insight into the planters' hostility toward missionary education of slaves. They feared that the lessons of the chapel and classroom would create a group of selfconscious subservients. They were convinced that these pious pedagogues were "public spies and private traducers, troublesome and ungrateful sojourners whose doctrines and conduct tended to excite insubordination and rebellion . . ." (Smith, 1817).

Missionary assumptions and practices were bound to disturb the ordered conventions of slave society where masters kept slaves in their place and slaves knew their place. The white population's stereotypes of happy "Sambos" and poor "Quashees" were based on a desire to deny them any hope for a change in status. Intelligent and astute adult bondsmen responded enthusiastically to the only education accessible to them. By all accounts

christianized slaves enjoyed those opportunities offered to them through their participation in chapel. It must have been significant for slaves to be associated on a *voluntary basis* with a school or chapel. After all, slaves had so few opportunities in the ordering of their own lives.² Finally, if missionaries “contaminated” the values of Caribbean slave subculture by introducing alien European values, let us remember, this was only after they had already been contaminated. The dehumanizing processes of perpetual bondage had already broken down their own social structures in the imposition of the worst kinds of European values. *In brief, the planters realized that merely by their presence the missionaries were influencing the society to be other than it was.*

Notes

¹ Smith was arrested after the 1823 Slave Revolt and died in prison. His case was much publicized in the British Abolitionist Press. *The Colonist*, October 27, 1823, January 1, 1824, and October 13, 1823; *The Guiana Chronicle and Demerara Gazette*, 1824 and March 1, 1824; *John Bull*, January 26, 1824, p. 36; *The Norwich Mercury*, June 14, 1824; *The New Times*, April 17, 1824 and *The Morning Chronicle*, June 3, 1824.

² Slave response to missionary education has been speculated upon in greater detail in a paper presented to the 1977 meeting of the Canadian Association of Foundations in Education, Fredericton, 1977, called “The World They Made: The Politics of Missionary Education to British West Indian Slaves (1800-33).”

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Priorities of Teacher Behaviours as Perceived by Student-Teachers in a School Based Program: An Exploratory Study

The teacher's role is comprised of a variety of expectations. The priorities assigned these expectations by an instructor provide one means of describing his teaching. It may also permit categorizing him as belonging to a group of persons who have similar priorities. This paper describes a group of student teachers and subgroups within the larger group on the basis of priorities assigned to expectations arrayed in a 60-item Q-sort. The total group of subjects, all of whom had experienced a year in a school-based alternative teacher education program, attached highest priority to items reflecting direct and positive interaction with pupils. On the basis of lower level priorities, three subgroups or types of student teachers within the larger group were distinguished. Type A is defined as giving low priority to ministerial and school directives, Type B is most concerned with classroom control and personal confidence, and Type C emphasizes the importance of social interaction among pupils. (Dr. Housego is in the Department of Educational Psychology and Dr. Boldt is a member of the Science Education Department, at the University of British Columbia.)

At the University of British Columbia, there are two standard degree programs that lead to the degree of B.Ed. (Elementary). One of these, the "regular program," is for students who enter the Faculty of Education after completing high school, while the other, the "transfer" program, is for students who transfer to the Faculty of Education after completing two years of Arts and/or Science courses elsewhere. Each of these programs entails in total a four-year sequence of coursework consisting of both professional (Education) courses and academic (Arts and/or Science) courses. In the transfer program, the first two years contain only academic coursework, usually completed at a community college. In the regular program, although the first two years contain *mainly* academic coursework, the students

complete an Education course in the second year, and in addition undertake student teaching. For both programs, the third and fourth years are very similar, consisting almost entirely of professional coursework and student teaching, theory alternating with practice. The stress throughout is on general teaching competence, but students are allowed a limited opportunity to begin to concentrate in special areas of interest, both academic and professional.

The Faculty of Education has initiated programs of teacher education that are different from, and alternative to, the standard programs. One of these is known as COVET (Cooperative Venture in the Education of Teachers). In its first three years of operation, it has been an alternative to the third year of the standard transfer program. In its fourth year, it will be a parallel alternative in the standard regular program. Essentially, the COVET alternative replaces the professional year with a program that is entirely school-based, a group of about 25 students receiving their coursework in one elementary school from a team of university personnel, and engaging in student-teaching in the same school throughout most of the year.

Program Rationale

One of the most persistent problems in teacher education is that of ensuring that theory and practice are successfully melded. The COVET program, which was designed to attempt a solution to this problem, is based on the following assumptions, stated in the current COVET Handbook (Bates, 1976):

1. there are some components of a teacher education program that the public schools and public school teachers are best able to provide;
2. there are some components of a teacher education program that the university and university teachers are best able to provide;
3. the likelihood of a more successful marriage between theory and practice will be increased when the school components are monitored by university personnel and when university components are monitored by school personnel;
4. effective monitoring, as described under 3, is more easily assured when the two sets of components occur in the same physical setting.

The initiators of this school-based teacher education program believe that participating teachers should see and know the university's contribution and should be allowed to influence and modify it to some degree, and similarly, that the participating teachers from the Faculty of Education should see and know the school's contribution and should be allowed to influence and modify it to some degree.

The public school has the resources and facilities to provide the practical component in a teacher education program. In the COVET program, students are deliberately exposed to a variety of classroom conditions and teaching styles; they experience working with children outside the classroom as well as inside, and they continually assess their own personal attributes and teaching aptitude from one situation to another. They are able to observe and be a part of many interrelationships that occur within the school, relationships among school personnel, and between school personnel and other agencies such as district services, parents, and the wider community.

The university is equipped to provide theoretical foundations for education, to summarize and interpret research and writing which have

implications for the improvement of teaching, and to provide a broader perspective than is customarily encountered in a single school. Therefore, the COVET program is based in a public school where student teachers receive theoretical instruction from university teachers working in the school, where they attempt to apply theory under realistic conditions with the guidance of the school's and the university's teaching staffs, and where daily interaction among three groups, the student teachers, the regular school teachers and university teachers occurs (Bates, 1976).

Program Operation

The development and implementation of alternative teacher education programs at U.B.C. in 1974 was based on several considerations: the belief that no one program to educate teachers had been demonstrated to be superior to all others; the expectation that smaller scale programs would probably be more personal than larger ones; the expectation that students or professors choosing their preferred program or style of teaching and learning would make greater efforts to ensure the success of the particular program, and, finally, the hope that alternative programs might serve the purpose of generating improvements in the standard programs of the faculty. In response to an invitation to all faculty to submit proposals for alternative programs, the COVET proposal was submitted to the special committee set up to receive such proposals. By the fall of 1974 the program was operational in a Vancouver elementary school with 24 third-year transfer students enrolled.

Aside from their lectures, the experiences of COVET students were of four types: classroom-laboratory, clinical, internship, and research and development. Classroom-laboratory experiences involved tasks selected to illuminate certain educational ideas such as various approaches to grouping for instruction or particular teaching strategies. Clinical experience provided real cases for observation in that a student might, for example, observe his sponsor-teacher working with an emotionally disturbed child or attempting to solve a disciplinary problem. Internship experiences were largely ones in which students engaged in teaching under realistic conditions with decreasing amounts of supervision. Research and development experiences were ones in which students attempted to relate research techniques and findings to school problems and conditions, perhaps carrying out their own minor investigations.

Students worked with a number of different sponsor teachers during the COVET year, which began with the commencement of school in September and ended with the university term the following April. Exposure to a variety of grade-levels and personal teaching styles was thereby assured and further augmented by a period of experience in another school of the student's own choice, a school known to have some features not present in the COVET school, for example, family grouping or perhaps open-area teaching.

The COVET program was assigned its own classroom in the school, this space serving as a location for university instruction in the teaching methods of the various subject-matter areas of the elementary school curriculum, in child growth and development, in measurement and evaluation and in educational foundations, in total, the equivalent of six full-year courses. The assigned classroom also served as a common room, a study area, and a library.

For two additional years, 1975-1977, the program has continued to operate in a similar fashion in a Richmond elementary school. In consultation with the school staff, some changes have been made in the number, length, and spacing of "teaching blocks," a teaching block being a period of time in which students are engaged in classroom activity for at least four half-days weekly, and during which time university instruction is accordingly reduced. Two three-week "instruction blocks," periods of time devoted exclusively to university instruction, one in September following a week of orientation activities, and one in January, have been standard. The number and variety of guest speakers, special seminar events, and opportunities to participate in school-wide functions (conventions, non-instructional day programs, etc.) have varied from year to year. Course offerings have changed somewhat either because of course changes in the regular program or in accordance with the availability of personnel. An outdoor education experience has become a regular feature. Despite modifications in content and basic organization, the program still bears a fairly close resemblance to the original.

Innovations are generally called upon to prove themselves, the COVET program being no exception. It was evaluated by the Northwest Regional Laboratory as part of an evaluation of all alternative programs in 1975, midway through their first year of operation (Worthen, Owens & Anderson, 1975). Internal, formative program evaluation instruments and procedures were also designed and used, and these generated some program changes; however, after three years of operation, a closer look at the "student product" of the program seemed appropriate. Having previously assessed student-teacher and sponsor-teacher reactions to course offerings, particular experiences, methods of scheduling, program administration, and the like, it seemed timely to shift focus to the psychological domain of the persons in the program. Could their reactions to a specific set of "critical behaviours" that occur in teaching be characterized in a particular way, and if so, could perceptions and changes in perception concerning these behaviours be used as a point of departure for program evaluation and program development?

Problem

One of the acknowledged strengths of school-based teacher education programs, a strength identified by student-teachers, by school personnel and by university personnel is their potential to provide a practical, realistic, and meaningful preparation for beginning teachers. Such programs afford the student the opportunity to become an integral part of a school in operation and to develop priorities among a set of behaviours which characterize the teacher's role, as perceived by experienced teachers and educational theorists. In order to pursue questions of priority with regard to components of teaching, it becomes necessary then, to identify behaviours which experienced practitioners and/or theorists regard as essential to defining the role of the professional educator.

According to Broudy (1958), education has distinctive problems of practice and resource of knowledge that can be used to deal with these problems. Problems of practice fall roughly into four categories: aims and policy, organization-administration, curriculum, and teaching-learning. Critical teacher behaviours in the aims and policy category have to do with formulating and implementing educational aims and objectives that are

consistent with educational policies established on some rational basis. Behaviours in the organization-administration category are all those that pertain to managing and organizing students, teachers, staff, resources, facilities, support services, and so forth, in order to facilitate the educational process in an appropriate and acceptable way. The curriculum category includes teacher behaviours having to do with designing, implementing, and evaluating curriculum specifications and materials. Lastly, behaviours in the teaching-learning category have to do with developing, implementing and evaluating teaching-learning strategies. Behaviours in this final category include lesson planning, teaching (directly or indirectly), and evaluating learning outcomes. Although the categories are not mutually exclusive, they are useful in mapping in a general way the activities of a teacher in the role of a professional educator.

Since schools operate in a number of different contexts of which the major ones are philosophical, psychological, historical and societal, problems of practice in the four categories described earlier will usually occur in one or more of these contexts. Considering these contexts as dimensions, one can say that critical teacher behaviours often fall on one or more of these dimensions (philosophical, psychological, historical, and societal) each of which spans the previously described four categories of critical teacher behaviours. To illustrate, an item, “controlling the class,” can be classified as belonging to the organization-administration category and also as falling on

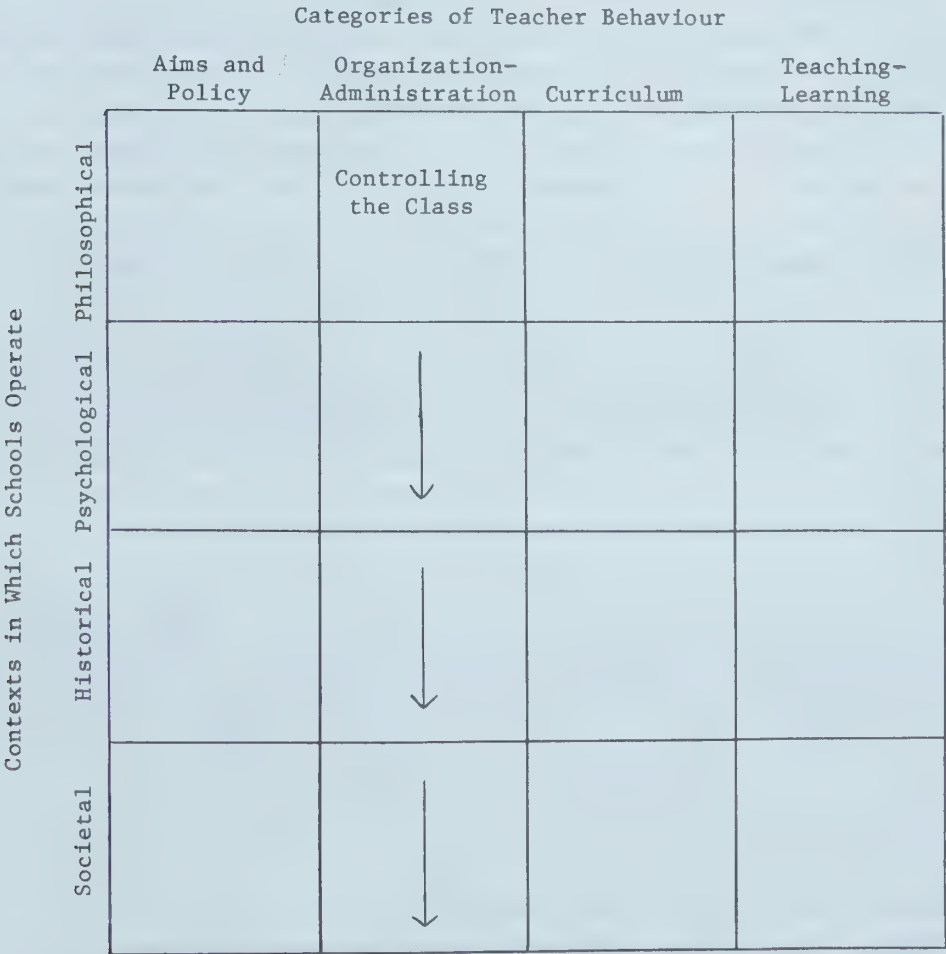


Figure 1. A two-dimensional categorization chart for components of teaching.

the philosophical, psychological, historical and societal dimensions (see Figure 1). Controlling the class from a particular philosophical perspective, for example that of the realist or the pragmatist, illustrates a philosophical component, whereas controlling the class according to the principles of behaviour modification illustrates a psychological component. Many teachers control classes simply according to tradition, perhaps through detentions or other conventional forms of punishment, thereby illustrating an historical component of the behaviour. Finally, parents, government, and society at large often have considerable influence on how children are controlled, thus illustrating the societal component of the particular behaviour.

Given a set of *possible* critical behaviours identified on the basis of the foregoing rationale, the problem is to assess the priorities assigned these behaviours by (a) students currently in the COVET program (COVET III), and (b) students in the COVET program during 1975-76 who are now completing their B.Ed. degrees (COVET II). The study also attempts to locate common patterns of priorities which emerge either in the total group of subjects or in subgroups thereof. These patterns characterize hypothetical types of subjects identified in later sections.

Method

Instrument

A 60-item Q-sort was used to measure perception of priorities among teacher behaviours, the independent variable of this study. The items in the Q-sort consist of concise statements of teacher behaviours generated according to the previously described rationale.

An original pool of over 100 critical teacher behaviours was constructed through an on-the-job and theoretical analysis involving discussions with principals, teachers, and student teachers, and a study of the literature (Ryans, 1960; Sontag, 1968; Broudy, 1958). Four faculty members involved in the COVET program for three years screened and edited the items to ensure validity for the purpose intended, i.e., to determine what priority, according to COVET students, a beginning teacher ought to assign to each of a range of critical teacher behaviours. The validity check reduced the pool of 100 items to the 60 items used in the final Q-sort. The items are listed in abbreviated form in Table 3.

Subjects

In the first phase of the study, presented in this paper, a group of 39 student teachers was studied. Twenty of the student teachers had been in the COVET program in 1975-76 and were completing a subsequent year of studies at the university, primarily in the areas of their academic and professional concentrations. The remaining 19 were just completing the 1976-77 COVET program, having transferred directly from two years of academic work in regional colleges to the COVET program.

Administration of the Instrument and Scoring

The 60-item Q-sort was administered to each of the 39 subjects. The subjects were asked to sort the behaviours into a quasi-normal distribution

TABLE 1
DESIGN AND SCORING SCHEME FOR THE Q-SORT

Evaluative Criterion	Highest Priority				Medium Priority				Lowest Priority		
Category	11	10	9	8	7	6	5	4	3	2	1
Frequency	2	3	4	6	9	12	9	6	4	3	2
Q-Score	11	10	9	8	7	6	5	4	3	2	1

M = 60 items

according to the priority each behaviour ought to be given by a beginning teacher. The design of the Q-sort and the scoring scheme is given in Table 1.

Test-Retest Reliability of the Q-Sort

In order to assess the stability of the Q-sorts over time, ten students, selected on the basis of convenience and availability from the COVET III group, repeated the initial sorting task after an intervening time period of one month. To what extent they constitute a random sample of all 39 subjects is not known, although no obvious student-characteristics could be seen as a source of systematic error.

The average test-retest coefficient of association was 0.67, which indicates that the sortings were reasonably stable over time, at least over a period of time in which the students were not in training. Along with this, it was noted by the authors that the highest priority items and the lowest priority items remained the same in the retest.

Statistical Analysis

The individual profiles of Q-scores of all 39 subjects were analyzed as follows:

1. Every subject's profile of Q-scores was correlated with every other subject's pattern of scores in order to determine common patterns of priorities.
2. The intercorrelations between individual profiles were analyzed to determine the least number of common patterns that could adequately represent the priorities of the subjects. The resulting common patterns of priorities were taken to characterize hypothetical types of subjects existing within the whole group of COVET students. Whether or not these types represented COVET II and COVET III students respectively, and therefore distinguished one group from the other was of particular interest.
3. In the final step of the analysis, an attempt was made to describe and compare the different types of subjects in terms of priorities assigned to the critical behaviours.

Results and Interpretation

Correlations Between Profiles

The correlations between Q-score profiles of the 39 subjects ranged from 0.01 to 0.75. Examination of the correlation coefficients suggests considerable consensus on the priorities assigned the items.

Identification of Subjects According to Type

The subjects were grouped or categorized on the basis of the type with which they were most highly correlated. Subjects 1, 4, 8, 14, 18, 27, and 29 belong to mixed types. Subject 38 is only weakly associated with any of the three types identified. Table 2 shows type membership by subject number, the number of subjects of each type and the COVET group to which each belongs.

TABLE 2
SUBJECTS BELONGING TO THE THREE DIFFERENT TYPES IDENTIFIED
BY NUMBER AND COVET GROUP

	Types ^a		
	A	B	C
	6	3	1
	8	4	2
	9	5	18
	10	7	20
	11	14	23
	12	15	24
	13	16	25
	17	30	31
	19	32	38
	21		
	22		
	26		
	27		
	28		
	29		
	33		
	34		
	35		
	36		
	37		
	39		
Total	21	9	9

^a Subjects above the dotted line are in the COVET III group and those below the line are in COVET II.

Comparison and Description of the Types

Items on which there is consensus across types. A consensus item is one on which, for all types, the difference between the largest z-score and the smallest z-score given that item is less than 1.00. Table 3 gives the items on which the three Types of students agree in order of priority, from highest to lowest. The rank-ordering of the items in terms of priority was based on the size of the average z-score of each of the consensus items across all three types.

Of note is the large number of items (70%) on which all the types seem to agree. From examination of the priorities given to these items, it seems clear that teacher behaviours falling on the psychological dimension of the teaching-learning category are top priority items for the beginning teacher, while behaviours falling on the societal dimension (compliance with

TABLE 3
CONSENSUS ITEMS IN ORDER OF PRIORITY FROM HIGHEST
TO LOWEST PRIORITY

Item	Average z-score
9. Stimulating interest in learning	2.14
10. Interacting positively with pupils	1.98
25. Being enthusiastic	1.84
31. Setting appropriate standards of achievement	1.55
7. Planning with pupils	1.08
40. Providing constructive feedback	0.97
4. Choosing appropriate level of subject matter	0.97
5. Choosing appropriate level of skills	0.91
12. Giving clear directions	0.82
16. Assisting pupils with subject matter	0.72
15. Encouraging good oral communication	0.70
6. Planning prior to teaching	0.71
1. Using variety of teaching methods	0.64
2. Knowing subject matter	0.64
30. Displaying a sense of humour	0.63
39. Keeping records of achievement	0.53
13. Questioning effectively	0.50
35. Disciplining pupils	0.42
3. Being competent in skills	0.41
59. Relating well to parents	0.38
34. Ensuring safety of pupils	0.37
28. Speaking clearly	0.30
37. Marking fairly	0.20
11. Using teaching aids	0.07
26. Using appropriate language	0.05
17. Giving suitable assignments	0.03
55. Participating in extra curricular activities	-0.16
57. Keeping a day-book	-0.36
23. Appearing neat and clean	-0.41
44. Conforming to policies of the school	-0.46
52. Respecting school property	-0.54
47. Using school equipment in a responsible way	-0.59
51. Using school supplies in a responsible way	-0.73
19. Giving suitable homework	-0.78
58. Keeping attendance records	-0.80
38. Marking promptly	-0.82
29. Modulating the voice	-0.88
18. Summarizing the lesson	-0.92
49. Giving adequate notice about changes	-0.96
32. Teaching groups of various sizes	-1.00
24. Dressing appropriately	-1.13
33. Supervising outside the classroom	-1.32

expectations of society and school authorities) of the organizational category are of lower priority.

Items on which there is disagreement across types. Figure 2 shows the items which differentiate among the three types. The differences between one type and the other two depicted in Figure 2 are summarized and discussed below:

More than Types B and C, Type A puts *high* priority on:

21. Being patient

More than Types B and C, Type A puts *low* priority on:

20. Keeping classroom neat and attractive

41. Teaching approved curriculum

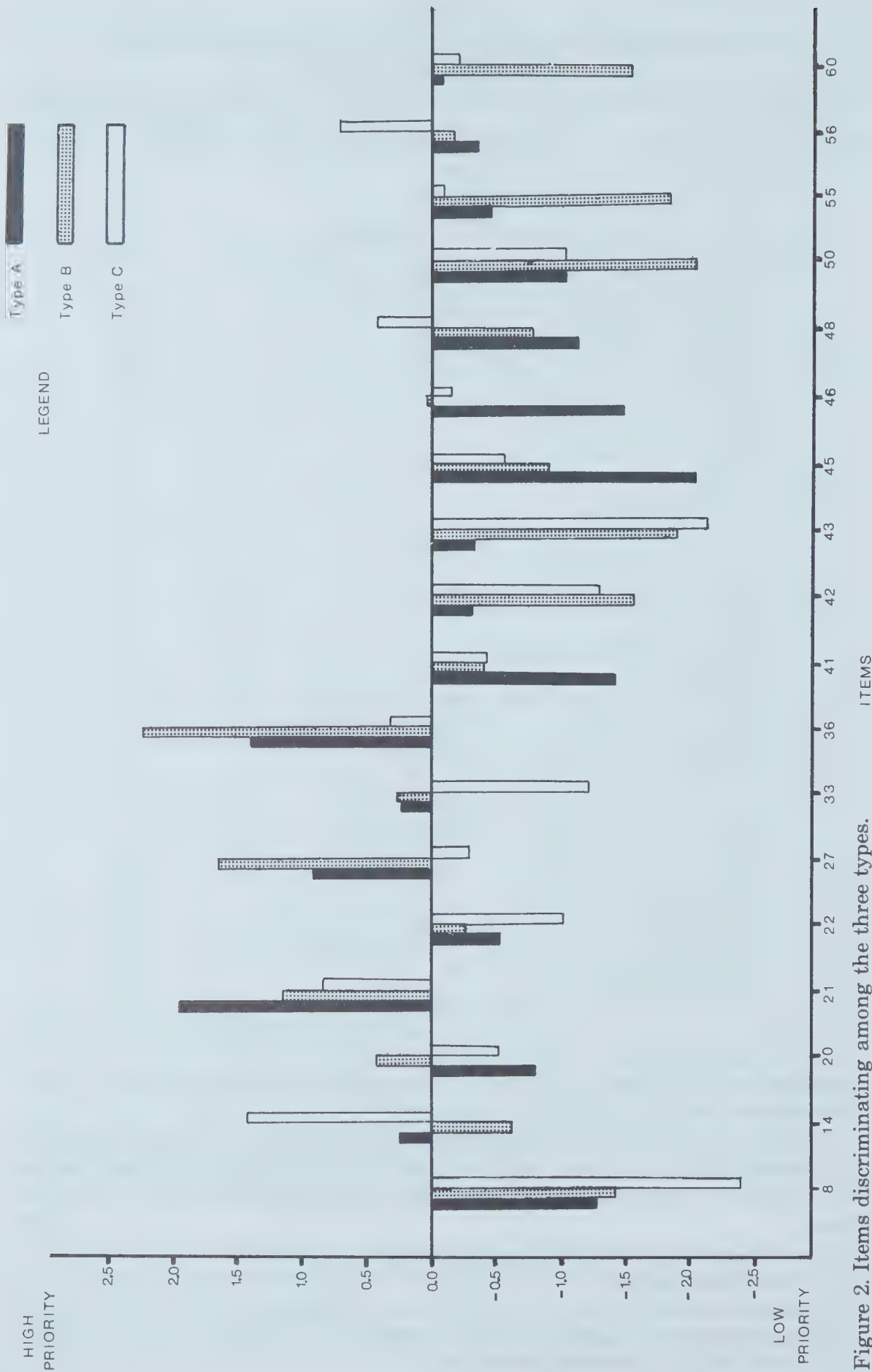


Figure 2. Items discriminating among the three types.

- 45. Conforming to requests of Ministry of Education
- 46. Conforming to guidelines set by principal
- 48. Responding promptly to requests by the principal
- 56. Reporting to parents

More than Types A and C, Type B puts *high* priority on:

- 20. Keeping classroom neat and attractive
- 27. Appearing confident
- 36. Controlling the class

More than Types A and C, Type B puts *low* priority on:

- 14. Assisting pupils in social interaction
- 42. Evaluating new curriculum materials
- 50. Making reasonable demands for materials and facilities
- 55. Participating in extra curricular activities
- 60. Utilizing community resources

More than Types A and B, Type C puts *high* priority on:

- 14. Assisting pupils in social interactions
- 48. Responding promptly to requests from the principal
- 56. Reporting to parents

More than Types A and B, Type C puts *low* priority on:

- 8. Timing parts of the lesson
- 22. Writing or printing legibly
- 27. Appearing confident
- 33. Organizing pupils for instruction
- 43. Developing new curriculum materials

A closer examination of Type A suggests that behaviours given lower priority than that given by the other types are those that fall along the societal (compliance with authority) dimension of several categories, curriculum, organization-administration, and aims-policy. Integrating these results suggests a perhaps somewhat anti-establishment group of students. Table 2 shows that the two COVET groups have similar numbers of students who share this view.

Type B emphasizes the priority of controlling the class, housekeeping, and appearing confident. These items can be as seen as falling along the psychological dimension of two categories, organization and, possibly, teacher-learning. Lower priority was given to items falling on the societal dimension (dealing with people and engaging in out-of-class activities involving the concerns and interests of students and society at large) of two categories, curriculum and organization. Taking these results together suggests a possibly insecure group of students who feel they have more than enough to cope with in managing the classroom. Of special note here is that Type B is predominantly made up of students in the COVET III program (see Table 2).

Type C, unlike the others, stresses the social interaction of students and meeting the expectations of administrators and parents, all societal concerns. These items seem to fall along the psychological dimension of the teaching-learning category and aspects of the historical and societal dimensions of organization and administration. Lower priority was given to other items in the organization and curriculum categories. The dimensions of these categories on which these items seem to fall are not clear, but most appear to have to do with the "mechanics" of teaching. Combining these results suggests a group of students who emphasize the humanistic aspects of

teaching. There seems to be no distinction between the two COVET groups on this priority.

The results of this study highlight considerable consensus. Overall, the highest priority is assigned to behaviours relating to direct and positive interaction with students, and the lowest priority is given to organizational and administrative behaviours. Another outcome of the study is the identification of at least three types of subjects, distinguished on the basis of the relative priority given behaviours having to do with personal concern, concern for controlling the class, and concern for the social and public aspects of teaching.

Only one clear distinction between the two already established subgroups, COVET II and COVET III, can be made. Type B, which put relatively high priority on personal concerns, housekeeping and controlling the class, was primarily represented by COVET III subjects, which may suggest that the more directly and the more recently the students have been involved in classroom teaching, the greater their concern for survival type behaviours.

It appears that the instrument developed in this study does discriminate between students recently involved in classroom teaching and those who are presently removed from it, pursuing academic and professional course work. Perhaps more importantly, it may have some practical utility in program development and evaluation.

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BOOK REVIEW

PSYCHOLOGY FOR THE CLASSROOM. *By Janice Gibson.* Scarborough, Ontario: Prentice-Hall of Canada Ltd., 1977, \$12.65, 563 pp.

Psychology for the Classroom is an academic textbook designed for university use. It would most likely be of use to instructors in the field of educational psychology, classroom management, or the psychology of instruction.

The text is rather comprehensive and does justice to most of the material it covers. Major sections include: (1) The Developing Individual — childhood years and the adolescent years. This section will not particularly enthrall developmental psychologists because topical issues related to education are given more coverage than developmental issues and principles. However, it is true to the book title in this regard. (2) Principles of Learning and Teaching — which overviews associationist learning theories, motivation in the classroom, and other traditional materials such as learning, forgetting, and transferring. (3) Individual Differences — which deals with “social disadvantaged” students with special needs, and the role of the teacher in coping with these matters in the classroom. This is an ambitious section done within the limits of a discipline which has a narrow, essentially technical, understanding of these social-philosophical issues. (4) Methods of Evaluation — which deals with testing, types of tests, and their classroom value. I found the section on the “developing individual” to be the weakest, with the evaluation section being the strongest. The writing style is consistent throughout, with emphasis on readability without resorting to the popular tendency among the writers of undergraduate textbooks to be cutesy or humorous.

The book is best suited to those professionals who prefer the “traditional” approach to educational psychology, who emphasize testing and evaluation, and who emphasize the variety of teaching-learning techniques which owe their origins to psychological learning theory. Little “soft” language punctuates the book but, which to me is a relief, there seems to be a conscious effort to make learning theory less stuffy and monotonous than some writers pretend it is. Each chapter and most subsections benefit nicely from summaries. Examples are used judiciously and with good effect. All in all, the book is well written, rather substantial, comprehensive, and academic. And, for a book which covers everything from Maslow’s need hierarchy to operant conditioning, that is a feat unto itself. My only real grievance with the book is

that the chapter on adolescent psychology is stereotypic and fails to assess pioneer ideas in the field, falling back instead on the guiding philosophy of the book: traditional educational psychology. The back to basics advocates will enjoy the book.

J. J. Mitchell, Professor
Department of Educational Psychology
The University of Alberta

The Same but Different

Understanding the Preschool
Retarded Child

by **John B. Fotheringham, M.D.**
& **Joan Morris, M.Ed.**

This is a book of interest to anyone who wishes to understand a retarded child. The authors mention in their preface that their intended audience includes "professional teachers and counsellors who, in their concentration on the normal or average, have had to overlook the 'different' one who will need their extra patience, teaching and guidance." (from the preface) Dr. John Fotheringham, director of Child Development and Counselling Services at North York General Hospital and Joan Morris, head of Guidance Services at Eastview Secondary School in Barrie, reason and write about a most complex subject with a clarity of style that will engage the attention of all readers. They point out that retarded children have the same basic needs and rights as all other people but that their retardation influences the expression of these needs.

108 pages/paper, \$3.85/cloth, \$6.00

Counselling the Intellectually Gifted Child

by **Avner Ziv**

This "jargon-free handbook" is "an excellent introductory overview for anyone — teachers, psychologists, parents, and the children themselves — interested in identifying and considering programs for the intellectually gifted." Dr. Ziv, director of the counselling program at Tel Aviv University, cautions readers that "the intellectually gifted are still children with emotional and physical abilities in keeping with their chronological ages, and that they must be considered as children rather than I.Q. scores."

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